THE PAPER INDUSTRY and PAPER WORLD

VOLUME 22
NUMBER 5
AUGUST, 1940

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ADVERTISING PAGES REMOVED

Drying Spaghetti, at The Foulds Milling Co.

Paper May Be Dried Like Spaghetti . . .

Early paper makers used to dip their deckles into tubs of furnish and hang the sheets to dry in the open air. No doubt they made good paper — but mighty little tonnage. Your job is to make better paper *fast* and cheap. The sheet must be dried in the time it travels from the press to the slitters. This takes steam and steam costs money.

Here is where Hamilton Felts enter the picture. A Hamilton Felt at the wet end of your machine will increase the efficiency of your press and deliver a dryer sheet to the rolls. It will give the paper a better formation and enable you to operate at higher speed with less down time for adjustments. And it will save a lot of steam.

From the thinnest tissue to the heaviest board there is a Hamilton Felt that will do your work better, faster and at lower cost.

SHULER & BENNINGHOFEN, HAMILTON, OHIO

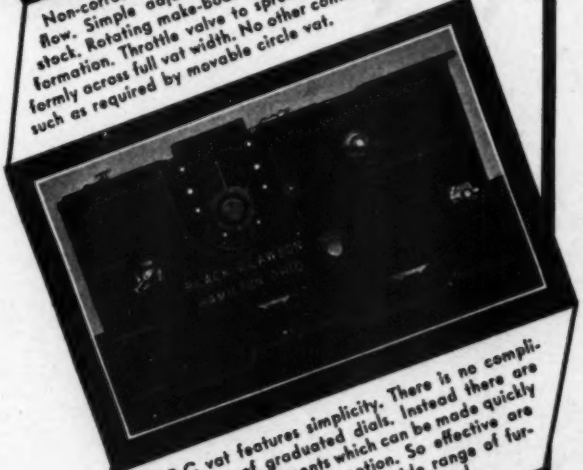
Miami Woolen Mills

Hamilton Felts

Established 1858

NO OTHER VAT *Can match it*

Non-corrosive lining presents no obstructions to stock flow. Simple adjustments to vary overflow, water and stock. Rotating make-board to permit close control over formation. Throttle valve to spread incoming stock uniformly across full vat width. No other controls are needed such as required by movable circle vat.



The B-C vat features simplicity. There is no complicated system of graduated dials. Instead there are simple, proven adjustments which can be made quickly and without lost motion. So effective are these adjustments on a wide range of furnishes that results are guaranteed.

AND THE B-C UNI-FLO VAT IS PROVING IT IN A SCORE OF MILLS

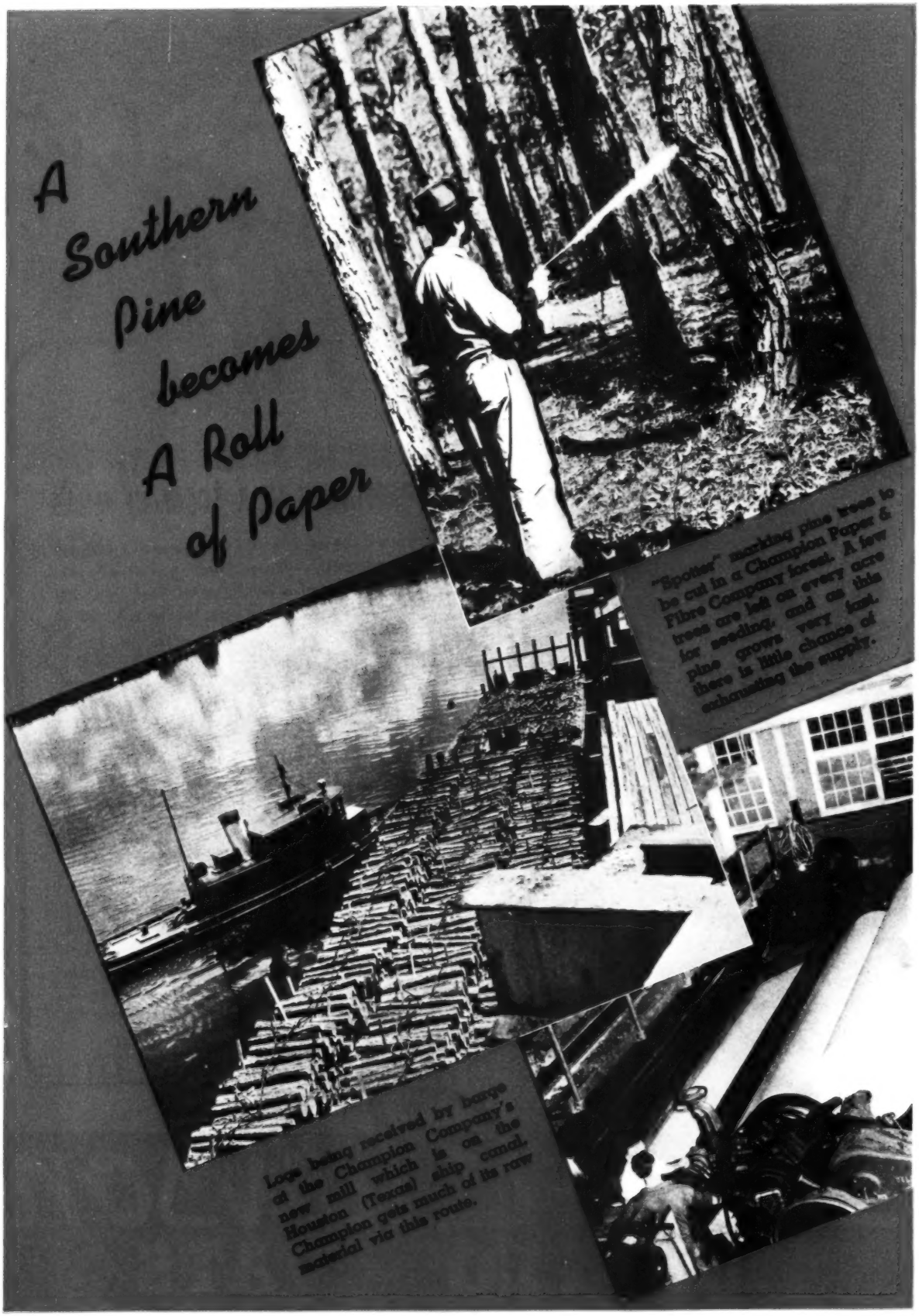
Here is the vat with **all** the features and **without** the gadgets . . . features that have already produced outstanding results on test liner, chip, .009 straw, rope, bag, flour sack, roofing felt, and all kinds of boxboards.

28c a ton for wet-end felting . . . 25% to 35% increase in production . . . $1.50 to $2 a ton saving on white furnish . . . more uniform water removal . . . smoother finishes . . . amazing increase in cross strength.

These are not claims . . . these are actual results that Black-Clawson Uni-Flo vats have accomplished. And what is more important, the lessons learned from these installations are yours to profit by when you install this superior Black-Clawson equipment.

Ask a Black-Clawson engineer to analyze your wet-end. It is possible that your present mold, bearings, and packing boxes can be adapted to the new B-C vat and still obtain remarkable savings. **The Black-Clawson Co., Hamilton, O. Operators of Shartle Bros., Middletown, O.**

Black-Clawson
UNI-FLO VATS


A Southern Pine becomes A Roll of Paper
"Spotter" marking pine trees to be cut in a Champion Paper & Fibre Company forest. A few trees are left on every acre for seeding, and as this pine grows very fast, there is little chance of exhausting the supply.
Logs being received by barge at the Champion Company's new mill which is on the Houston (Texas) ship canal. Champion gets much of its raw material via this route.

CONTRACTS LET—PLANS ANNOUNCED FOR *Pensacola*

▸▸▸ ABOUT A YEAR AGO, the Florida Pulp and Paper Company was organized with headquarters at Pensacola, Florida. With this announcement came the news that the company would formulate plans for building a new mill which would manufacture white book and wrapping paper, also bond papers, from southern pine.

As this new company progressed, news has been published, and now an official announcement that has long been awaited has been released. The latest news is that work on the plant will begin immediately. Buildings now planned are: several large units for the pulp and paper-making divisions, a power house, pumping station, and auxiliary buildings.

As already announced in these columns, the mill will cost approximately $3,000,000. The announcement just made states that the Rust Engineering Company has been given the contract to build the plant, and Hardy S. Ferguson, of New York, is consulting engineer.

The personnel of this company (for the information of those who have not read this news published in previous issues) includes some very well-known leaders in the industry. They are: James H. Allen, formerly with Union Bag and Paper Corporation, Savannah, Georgia, president; A. D. Pace, vice president and treasurer; J. C. Pace, vice president; John Gamble, formerly with Union Bag and Paper Corporation, Savannah, vice president and general manager; J. McHenry Jones, secretary; and R. C. Seip, chief engineer. Mr. Seip was resident engineer for Hardy S. Ferguson during the construction of the Crossett Paper Mills, Crossett, Arkansas, remaining with the Crossett organization after the plant was completed as chief engineer.

The mill is to be built at a most strategic location on a 600-acre site known as Cantonment just a few miles outside the City of Pensacola. When the mill is finished, it is thought about 500 persons will be employed with additional employment in the forests.

The Pace Brothers have long been well connected with large timber holdings, and the company will have access to large tracts of timber lands in Escambia County owned by these men. Sawmills and other equipment will be located there to take care of the mill's pulpwood requirements.

The affairs of this new company have been planned with the greatest care and foresight; its location is most strategic; and the company is assured of raw material because of its vast timber holdings; its water supply is assured; and it has been most fortunate that men were selected to manage the company who have just the experience necessary to build and operate such a mill successfully.

It is expected that work on the buildings will begin immediatelv, and it is hoped the plant will be ready for production in about a year. The financing has been adequately planned, and an agreement has been made for the sale of the mill's output.

James Allen, president, has given some interesting facts concerning the company's forestry policy. He states the company owns outright 125,000 acres of land valued at approximately $1,250,000. By using the timber from these holdings through selective cutting and employing scientific forestry methods, the company plans to carry on its forestry operations profitably. Through this extensive method, such a plan serves a double purpose: (1) it insures the paper mill of suitable and permanent raw material supplies, and (2) it serves the humanitarian aspect by building up the morale of the class of labor upon which the company must depend.

And so the industrial curve in the South points higher. The vast natural resources, water supply, shipping facilities, climatic conditions, and labor advantages seem to fit all of the requirements of the paper industry which has brought the South to the front as one of the most fertile sections in this country for our industry.

▶▶▶ SALES OF the textbooks, *The Manufacture of Pulp and Paper*, prove the acceptance of this series as authority on the subject. R. S. Kellogg, secretary of the Joint Textbook Committee, reports the sale of 1021 copies of these books during the first half of this year.

◆

CHAMPION MILL IS RUNNING AT TOP CAPACITY

The new Pasadena (Texas) mill of the Champion Paper and Fibre Company was operating at its capacity production peak of 120 tons of printing paper daily as the first month of operations for its new production unit drew to a close.

The addition to the Pasadena pulp mill, which opened in 1937, brings Champion's production in Houston to 260 tons of pulp paper daily and 120 tons of printing paper. The paper and pulp is made from southern pine, most of which is cut in the immediate vicinity of Houston. The number of employees since the completion of the new paper machine has been boosted to near the 600 mark with an increase of about 150 men.

◆

CALL INDUSTRY'S REPRESENTATIVES

On July 23, representatives of the American Paper and Pulp Association and the United States Producers Association met at the request of Thomas B. McCabe and his associates on the Advisory Commission to the Council of National Defense.

The meeting brought out many valuable and interesting discussions, and the opinions voiced by those present have just been published in the proceedings. This material was received too late to be published at length, but mention of it will be made in succeeding issues.

◆

GEORGIA MAY GET NEW PAPER MILL

Rumor of another paper mill for the south, this time in the State of Georgia, was given strength by news reports that a group of business men and an unidentified manufacturer are discussing the proposal with a view towards erecting the plant in the town of Valdosta in the southern part of the state.

According to the report, F. H. Brown, vice president in charge of traffic of the Georgia and Florida division of the Southern Railway, has conferred with members of the industrial staff of the railroad company in the interest of the proposed mill. With Mr. Brown, the report went on, was M. F. Wendt of the engineering firm of Johnson and Wierk of New York City. The delegation, accompanied by Chamber of Commerce officers, made a preliminary survey of Lowndes County with a view of ascertaining probable sites for the mill. Two major problems confront the erection of a mill. These are: (1) lack of sufficient water supply and (2) the disposal of water.

It is said that Valdosta business interests have a proposal from a thoroughly responsible source for the establishment of a paper mill provided the city will put up $150,000. The promoter has agreed to put up a like amount, it is said, and with the total is of the opinion that funds can be obtained up to $3,000,000 for financing.

View of the entrance of the new Northern Regional Research Laboratory now under construction at Peoria, Illinois. The building extends back to the rear of the property where a power house is nearly completed. One of the primary functions of this laboratory will be to develop new and improved methods for the production of cellulose from agricultural materials. It will take in an area including the states of Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Ohio, Nebraska, North and South Dakota, and Wisconsin.

◆

POWELL RIVER BUILDING DAM

The Powell River Company has awarded Stuart Cameron and Company, Vancouver, a contract for the construction of a concrete dam at Lois River. The dam, which will be the biggest of its kind in British Columbia in several years, will take about two years to complete.

The primary purpose of the dam is to replace a temporary log crib dam constructed in 1930 and the immediate increase in power output will be about 1500 hp. The new dam, however, will raise the level of the lake about fifty feet and will permit the installation of a second 18,000 kv.-a. hydroelectric unit at the company's power plant at Stillwater if and when it becomes desirable.

◆

LIGHTNING STOPS OPERATIONS AT NEKOOSA MILL

On July 29, lightning accompanying the worst storm to strike the Port Edwards-Nekoosa district in many years struck the 15,000-volt main transmission line to the Nekoosa mill of the Nekoosa-Edwards Paper Company, burning off two wires and shutting off power for several hours.

The lightning struck the power line about a hundred feet from the mill clockhouse. Because of the power shut-off, one paper machine in the Nekoosa mill was delayed about four hours in starting on Monday morning.

◆

I. P. CO. DEFERS BOND OFFERING

The proposed offering of International Paper Company first mortgage bonds has been postponed by the company and its underwriters. It had been expected that the financing plan could be completed before August 1 in order to permit the call of the company's 6 per cent refunding mortgage bonds on the next redemption date, September 1, but it has been found impracticable to carry out the original time schedule.

"Yu-u-r-r out!"

. . . SCREAMED THE UMPIRE ON PAGE 14 TO THE PENGUIN ON PAGE 15

"You mean . . . I'm *in!*" yawned the penguin, fluffing the infield dust from his wings and settling on home plate. "I'm *show-through* from the next page. I'm always getting into other people's business."

"Get offa the field or I'll fine ya!" roared the ump. "You—foul ball!"

"Now, now, ump," soothed the penguin. "Mustn't lose your temper. I know a cheaper way to strike me out of the picture."

"You mean Krebs Pigments?"

"Sure," said the penguin. "Krebs makes the thinnest paper opaque. Tell the paper-maker about these pigments, then watch me disappear like a home run over the fence."

"Sounds like a clean hit to me," said the ump, scratching his head.

"Cleanest you ever made," agreed the penguin. "You ought to see how white and bright Krebs Pigments make the paper . . . printing so sharp and clear on both sides that even the blindest umpire can read it."

"Opacity and whiteness, huh? That's a double play."

". . . *triple play*, ump. The Krebs people will help you with your technical problems, too. Just pitch 'em a letter —it only takes a minute."

"Play ball!" yelled the ump picking up his mask.

". . . with Krebs Pigments," winked the penguin.

KREBS PIGMENT & COLOR CORP.

1007 Orange Street . . . Wilmington, Delaware

ENGLISH CHINA CLAY ARRIVES AT PORTLAND

A Japanese freighter arrived at Portland, Maine, late in July with a cargo of 4,500 tons of English China clay for Maine paper mills. The ship is one of the very few non-British ships or ships of allied countries whose vessels have been taken over by the British since the invasion to bring cargo here from one of the belligerents. The captain of the vessel reported that his steamer was not molested in any way. It is reported that although the waters adjacent to the China clay port of Fowey, England, have been heavily mined, every effort is being made to continue shipments.

◆

FORECLOSURE OF ABITIBI IS PROTESTED

A committee of shareholders of Abitibi Power and Paper Company has sent a protest to the Premiers of Ontario and Quebec against foreclosure sale of the assets of the company. Mr. Justice Middleton of the Ontario Supreme Court, made an order on June 10 directing publication of advertisements looking to the sale of properties in October of this year. Copies of the letter of protest have been sent to the chairmen of the committees of preferred and common shareholders of the company. It states attempts to "force foreclosure" are quite "unnecessary at a period when the company is prospering and shareholders' equity improving."

◆

INDUSTRY'S WAGE BASE FIXED AT 40 CENTS HOUR

A final ruling fixing a minimum of 40 cents per hour as the wage base for the entire paper industry was promulgated July 25, effective September 16, 1940. This ruling follows the majority report of the Industry Committee, of whose membership the entire labor section approved the 40-cent base opposed by all the employer representatives. While some of the public representatives joined in a minority report, the majority favored the 40-cent base. The official announcement says the ruling will affect some 8,500 of the 150,000 employees of the industry.

In connection with the definition of the industry the administrator, Colonel Philip B. Fleming, determined upon the entire record that the manufacture of "insulation board" is not within the scope of the definition. Employees engaged in the production of pulp for use in the manufacture of "insulation board" are covered by the Wage Order, Colonel Fleming found.

The findings noted that economic data considered by the committee indicated that a 40-cent minimum would result in a direct increase in the total wage bill of the entire industry of about 0.45 per cent. As labor costs in the industry range from 17.1 per cent to 22.2 per cent of operating costs, the 40-cent minimum would result in an increased operating cost of approximately 0.10 per cent. In the hearings in Washington, a report stated, it was shown that the raising of wages for the 8,500 affected would have a serious effect on the financial future of the few companies which are not already paying the minimum figure.

◆

NEPCO MAKES CHANGES IN SOME OF ITS BOILERS

At the Port Edwards (Wis.) plant of Nekoosa-Edwards Paper Company, the No. 4 boiler has had the Riley No. 4 pulverizer rebuilt with 25 per cent added capacity. Increased Dietrick air-cooled brick walls have been installed and new Diamond soot blowers added.

Changes also will be made, starting about the middle of August, in the No. 3 boiler. A Babcock & Wilcox ball mill will be added. These changes are being made so that a cheaper grade of coal can be used with the same power efficiency.

◆

PROCUREMENT INFORMATION NOW AVAILABLE

Manufacturing companies wishing information on industrial mobilization, especially as to procurement, may obtain such information from numerous major field procurement offices in the United States. The War and Navy Departments state that current information of this type is facilitated by contacting these field offices, rather than attempting to obtain the information at Washington.

The War Department maintains 46 major field procurement offices in 22 cities while the Navy Department has 27 offices in 23 cities. Officials at these 73 field offices are kept in closest touch with not only present purchasing needs but also with all other industrial mobilization matters pertaining to their areas, a report from the Department of Commerce states.

SUSPEND WOLF AWARDS AT '41 EXPOSITION

The Irwin D. Wolf Awards for distinctive merit in packaging will not be held in connection with the Annual Packaging, Packing and Shipping Exposition scheduled for Chicago in April, 1941, but will be suspended for this year pending a study of how the awards should be revised to better meet the newer phases of packaging developments in the future. Suspension of the awards was announced by Alvin E. Dodd, president of the American Management Association, sponsors of the Exposition and the awards. The awards were established by the association in 1931 at the suggestion of Irwin D. Wolf, vice president of the Kauffmann Department Stores of Pittsburgh and their purpose has been to stimulate constructive effort in developing the art of packaging.

◆

BILL FOLLOWS INDICTMENT OF PAPER FIRMS

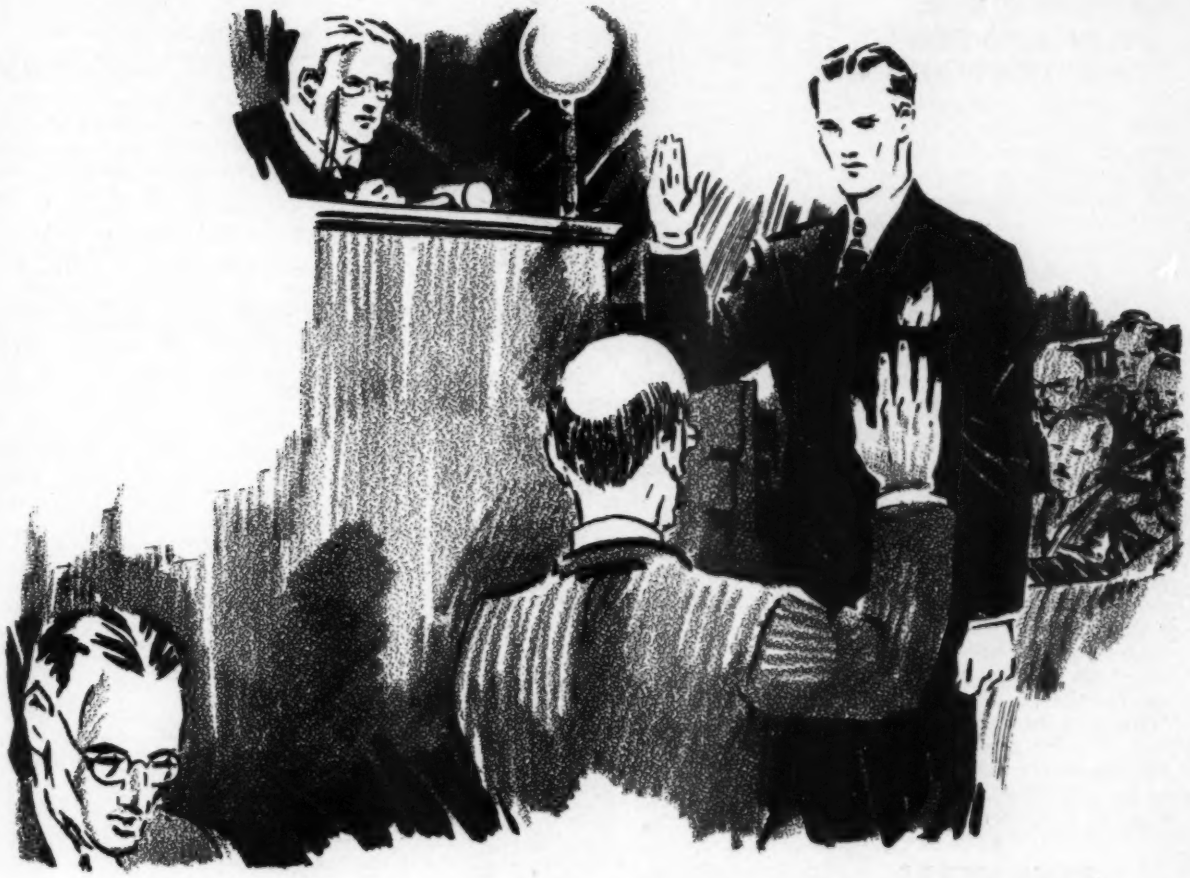
The indictment of various paper companies for violating the wage and hour law by conspiracy to hold down payments to woods workers has been followed by the introduction of a bill in Congress calling for a congressional investigation of the "apparent monopolistic program" of the mills. The preamble states that southern farmers realize only 15 cents to $1 per cord while the paper mills have increased prices from $65 to $85 per ton without reflecting this advance in higher payments to those who provide pulpwood on a "starvation basis."

◆

MORE SPACE FOR U. OF MAINE'S CHEMICAL DEPT.

Increased space for instruction in chemistry of the pulp and paper industry and the general technology of the industry are to be supplied by the extension to the chemical building of the University of Maine at Orono. Trustees of the university voted the increase on July 14 and the work is now under way. The new structure will be available some time during the second semester of the new academic year.

Laboratories for unit operations such as distillation and absorption columns related to the pulp and paper industry will occupy the first floor and also a large part of the second floor. Research laboratories will also be located on the second floor. Classrooms will occupy the third and fourth floors.



GET THE TRUTH

About disc mills. Get complete information on the Monarch Rotary Refiner.

On chips, raw, soaked, semi-cooked.

On rejects, bull screen or fine screen.

The Monarch Rotary Refiner has distinct advantages.

Tell us your requirements. Our recommendations will cost you nothing—may save you thousands of dollars. Experimental facilities are available.

Sprout, Waldron & Company

Designers - Engineers - Manufacturers

193 Sherman Street
Muncy, Pennsylvania

Would you like to make alpha flock or fluff? Write us.

SOUTHERN DIV. FOR MENASHA WOODENWARE CO.

A corrugated box factory, to be known as the Southern Division of the Menasha Woodenware Company, will be opened about September 15 at Durham, North Carolina, it was announced by Donald Shepard, vice president of the company. The Durham plant, upon which the Menasha concern has secured a five year lease with option for renewal, is being renovated to accommodate machinery for making corrugated boxes.

The company, which now maintains a corrugated box plant at Menasha, Wisconsin, will make several personnel changes as a result of the new southern plant. J. F. Burnham, a ten-year employee of the Menasha concern, will be transferred to Durham where he will become manager. Others from the parent concern who will transfer south are Roman Suess, who will be in charge of the office work; Oscar Smith who will become plant superintendent, and Tom Youn who will head the designing department.

Side track facilities at the Durham plant are being improved and loading doors for both trucks and freight cars are being installed. Machinery is expected by September 1.

◆

FINANCIAL

The war situation in Europe has resulted in an almost unprecedented inactivity in the securities markets. Sales of securities during the past month have been in the smallest volume for twenty years. While some lines of business, particularly those affected by war contracts, are very active, the usual summer dullness in the paper market is being felt, with the result that many mills are cutting into their back logs of unfilled orders.

Brown Corporation—Earnings for the twenty-four weeks ending May 18 were $1,344,713, as compared with a loss of $154,444 for the same period in 1939.

Champion Paper and Fibre Company—Net earnings for the year ending April 28 were $1,731,938, as compared with $446,648 for the preceding year.

Container Corporation—Net profit for the quarter ending June 30 was $619,021, as against a net profit for the same quarter of 1939 of $8,049.

Crown-Zellerbach Corporation—Net profits for the year ending April 30 were an all-time peak, being $8,119,494, as compared with $5,115,390 for the preceding year. The company has refunded $12,000,000 in bank loans, reducing the average interest from 3.3 to 2.07 per cent.

Hinde and Dauch Paper Company—Earnings for the first six months of 1940 were $482,319, as against $323,933 for the same period in 1939.

International Paper Company—President R. J. Cullen announces that in five years International has made capital expenditures of nearly $44,000,000, of which nearly 80 per cent was in United States properties. Of the total, over $22,000,000 was expended in the development of new capacity in the kraft field.

Johns-Manville Corporation—Net earnings for the half year ending June 30 were $1,884,976, as against $1,203,744 for the same period in 1939.

Keyes Fibre Company—Net earnings for the first six months of the year were $120,246, as agaainst $92,327 for the previous year's first half.

Kimberly-Clark Corporation—Net profits for the year ending June 30 were $2,291,535, as against $1,074,761 for the preceding year.

Masonite Corporation—Earnings for the twelve weeks ending June 8 were $333,566, as compared with $258,380 in the same period of 1939.

Mead Corporation—Net earnings for the twenty-four weeks ending June 15 were $681,531.89, as compared with $157,219.65 for the similar period of 1939.

Mosinee Paper Mills Company—Net loss of $23,247 is reported for the year to May 31, as compared with a loss of $212,229 for the same period in 1939.

Nekoosa-Edwards Paper Company—Net earnings for the March quarter were $90,553, as against $37,816 for the same quarter of 1939.

Rayonier, Incorporated—Net profit for the year ending April 30 was $2,389,488, as compared with $1,176,646 for the preceding year. Indicated net profit for the final quarter was over $950,000, as compared with a loss of nearly $250,000 for the same period in 1939. A dividend of $1 per share has been voted on the $2 preferred stock, reducing unpaid accumulations to $150 per share.

Scott Paper Company—Net earnings for the first half of 1940 were $752,806, compared with $727,579 for the same period in 1939. Net sales were the largest in the company's history.

Sutherland Paper Company—Earnings for the year ending June 30 were $901,796, as compared with $437,525 in the previous year.

Tomahawk Kraft Paper Company—Net income for the year ending May 31 was $90,135, as against a net loss for the preceding year of $96,589.

Dividends declared include 15 cents per share on Union Bag and Paper Company, and $2 by United Paperboard Company, a resumption of payments in the latter case of payments which ceased in early 1938.

New York Stock Exchange—Stocks

	Closing Prices July 25 1940	June 25 1940
A. P. W. Paper Co.	*1¾–2⅜	*2–2⅜
Celotex	6¼	6
Same Preferred	*53–58	*47–50
Certain-Teed	*4¼–4½	4
Champion P. & F. Co.	*22–23	21¼
Same Preferred		*96½–100
Container Corp.	13⅞	11⅞
Cont. Diamond	*5¾–6	6⅛
Crown Zellerbach	14⅛	14
Same Preferred	*87–90	83
Dixie Vortex	11	*10–10⅜
Same "A"	*33–34	*32¼–35¼
Robert Gair	*2½–2¾	2¾
Same Preferred	*11⅛–11¾	12
Gaylord Container	*9⅜–11	9
Same Preferred	*47–55	*45–55
International P. & P. Co.	12	12¼
Same Preferred	46⅞	46¾
Kimberly-Clark	*31⅛–32¾	*32¾–35¼
MacAndrews & Forbes	27¾	27
Masonite	24½–25	23¼
Mead Corp.	*8½–8¾	9⅜
Same 6% Preferred	*79–84	*71–75
Paraffine Co.		28¼
Same Preferred	*90–97	89½
Rayonier	15	15½
Same Preferred	*27½–29½	27½
Scott Paper	39¼	37⅛
Same Preferred	*112⅜–114	107½
Sutherland Paper	*24¾–25½	*21½–22⅜
Union Bag & Paper	10⅜	10¾
United Paperboard		10¾
U. S. Gypsum	61⅜	32½
Same Preferred	*175–182	*172½–175

New York Stock Exchange—Bonds

Celotex 4½%		73¾
Certain-Teed 5½%		73½
Champion P. & F. Co.		
Container Corp. 5%		
Inter. P. & P. Co. 5%		
Same 6%	101	98½

New York Curb Exchange—Stocks

Am. Boxboard		4⅜
Brown Co. Pfd.	*16½–18½	*15½–17
Det. Paper Prod.		
Great Northern	*41½–42½	42
Hummel Ross	5½	*5⅜–6
Nat. Container	*8½–9⅞	*1½–2½
St. Regis	2½	2½
Taggart	*2⅜–2⅞	2⅞
United Wallpaper		1¾

*Closing Bid and Asked Prices.

. . . wire is draped in tending aisle, then mechanically installed in operating position.

Fourdrinier in operating position.

Wire holder handled by crane.

Under-carriage in position ready to drape wire.

Wire draped on under-carriage ready to install.

Views show installation of Fourdrinier Wires by exclusive Puseyjones "Rapidrape" Method, at Southland Paper Mills, Lufkin (Herty) Texas.

"Rapidrape" Wire Handling is just what its name suggests—a new easy way to drape Fourdrinier Wires. Production formerly lost through shut-downs is reduced to a minimum because the handling time is shortened.

With "Rapidrape" Wire Handling, the under-carriage is rolled into the tending aisle on suitable tracks set at floor level, then rolled back to operating position after the wire is on. Cleaning is simplified with the under-carriage in the aisle.

There is no danger of deflection stresses and distortion as experienced with complete removal or cantilever change. The Fourdrinier part remains in perfect alignment at all times, adequately supported at front and back. Can be installed without disconnecting shake mechanism, suction box hoses, showers or frame supports.

Be sure that your next machine is equipped with "Rapidrape" Wire Handling, as well as other patented improvements that make Puseyjones the leader in the design and construction of paper-making machinery.

THE SIGN OF TRADE MARK SUPERIOR QUALITY

THE PUSEY AND JONES CORPORATION

Established 1848. Builders of Paper-making Machinery

Wilmington, Delaware, U. S. A.

REPAIR FLOOD DAMAGE ON THE NEKOOSA DAM

Repair crews have worked the past nine Sundays in succession on the rather extensive program of repairs on the Nekoosa dam of the Nekoosa-Edwards Paper Company. Erratic high water this spring and summer necessitated the repairs.

One hundred and twenty feet of new crest timber has been installed at the west end of the dam, replacing a section that has been in service at least 35 years.

This dam was built in 1892, 48 years ago, and has had only one new crest timber and top rebuilding in that time. Plans have also been made for four new gates to be built in the west end of the dam in the near future.

Louis Koehn has been in charge of the Nekoosa dam, groundwood mill, hydro plant and turbines since 1902.

◆

WASHINGTON

▶▶▶ PULP AND PAPER MILL EXECUTIVES and personnel men will be interested in learning that registration and fingerprinting of all aliens is to start on August 27 and extend through December 26 of this year. The Alien Registration Act, as passed by the Congress of the United States, constitutes an important step in the National Defense program. The Act requires the registration and fingerprinting of all aliens above fourteen years of age and the registration of aliens under fourteen years of age by their parents or guardians. It has been pointed out that it is not the intention of the United States Government to discriminate against aliens by this action but rather is designed as a program for the protection of this country and the protection of all loyal aliens in it. The Act provides that all records be kept secret and confidential.

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▶▶▶ A GOVERNMENT PLANT to convert nitrated cotton and ether alcohol into an explosive jelly is to be erected between Charlestown and Jefferson, Indiana, a news report states. The plant is to be constructed below the earth under the surface of the farm lands in that area and is expected to almost treble the country's output of so-called smokeless powder. Barely 60 miles from the fortified vaults at Fort Knox, Kentucky, the government plant is being built by E. I. du Pont de Nemours Company on a cost plus fixed fee basis.

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▶▶▶ THE BOARD OF DIRECTORS of the Bathurst Power and Paper Company, Bathurst, N. B., inspected the firm recently. The directors met at St. John, N. B., and motored to Bathurst after which they inspected the various mills of the company. Departmental heads were guests at a luncheon following the inspection.

John Stevens, Jr., vice president of Marathon Paper Mills Company, Rothschild, Wisconsin, stands at attention during flag raising ceremony on July 11, following practice suggested by H. W. Prentis, Jr., president of the National Association of Manufacturers, that industrial plants raise the flag every day—not just on holidays. The flag in the picture is being raised by the Rothschild troop of Boy Scouts.

BRIEFS

▶▶▶ COLONEL PHILIP B. FLEMING, administrator of the Wage and Hour Division of the Department of Labor, has named a Converted Paper Products Committee to recommend minimum wage rates. Nine representatives of the public, labor representatives and nine employer representatives were named. The employer representatives include envelope, bag, board and other converters.

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▶▶▶ PLANS FOR CONSTRUCTION WORK and installation of new equipment have been made by the Sidney Roofing and Paper Company, Ltd., Victoria, B. C. Plans include a new fireproof building which will contain the new equipment. The new unit should get under way within six months, it was said.

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▶▶▶ A NEW ADDITION is to be built to the Port Arthur (Ontario) mill of Provincial Paper, Ltd., it was reported recently. The addition will be one story high, about 35 by 140 feet, and is expected to cost around $75,000.

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▶▶▶ MOBILIZATION OF a Canadian Forestry Corps for work overseas was announced recently. Brigadier-General White, vice president and director of the Canadian International Paper Company, will command the corps.

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▶▶▶ SAVANNAH IS TO BECOME the distribution point for newsprint for Georgia and the Carolinas, representatives of the International Paper Sales Company, Inc., have announced. About one ship a month, making an annual importation here of from 15,000 to 20,000 tons of paper, may be expected, it was pointed out.

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▶▶▶ DUE TO THE WAR BLOCKADE of previously competing Scandinavian trade, the newsprint and wood pulp exports of Canada have increased considerably. June exports of newsprint totaled 6,413,000 hundredweight compared with 4,893,000 hundredweight in June, 1939. Exports in June, 1940, were valued at $15,168,000 while exports in June, 1939, had a valuation of $10,680,000.

▶▶▶ THE ACME PAPER BOX COMPANY, Chicago, will spend $25,000 in the modernization of a former plant of the Todd Company, it was reported recently. The plant, recently purchased by the Acme organization, will contain an air-conditioned press room.

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▶▶▶ A NEW FIBER BOARD plant is now being erected by the Texas Gypsum Mining and Construction Company at Houston, Texas, it was reported recently. The plant is to cost $200,000.

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▶▶▶ A NEW STEAM POWER PLANT is now being constructed at the Thorold (Ontario) plant of the Ontario Paper Company.

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▶▶▶ THE HUMMEL-ROSS FIBRE CORPORATION has consummated negotiations with Sir Herbert Gepp, managing director of Australian Paper Manufacturers, Ltd., Melbourne, Australia, for the sale of plans and technical information for two secondary head boxes.

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▶▶▶ NOW CONSIDERING PLANS for a new addition to its mill at Merritton, Ontario, is Alliance Paper Mills, Ltd. The addition would be a one-story affair and would cost about $60,000 with equipment.

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▶▶▶ A NEW PLANT is to be acquired by the Fort Wayne Corrugated Paper Company, Fort Wayne, Indiana. The plant, now being erected in Chicago's central manufacturing district, is in addition to another plot of ground containing about 48,000 square feet of ground.

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▶▶▶ REPAIR WORK on the old Outagamie Paper Company mill at Kaukauna, Wisconsin, now owned by the Cohen brothers, is well under way according to last reports. It is understood that work on one of the mill's two paper machines is half finished and that operations will begin shortly.

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▶▶▶ THE RYEGATE PAPER COMPANY, Ryegate, Vermont, purchased 2,000 cords of pulpwood from the Northeastern Timber Salvage Administration. Purchase of this wood was $15 per cord, rossed. The Groveton Paper Company bought 4,040 cords of pulpwood from the same agency.

3-Way Elevated Storage Plan

Utilized at RAYONIER, INC. Sulphite Pulp Mill

1. FOR SEA WATER: The 100,000-gal. tank shown at the right is used to store sea water obtained from a nearby tidal river. This tank is 50 ft. to bottom, and floats on the sea water line behind filters to maintain a constant pressure to various softening units as well as to handle their demands.

2. FOR GENERAL SERVICE: The Horton ellipsoidal-bottom tank illustrated at the left also has a capacity of 100,000-gals., and measures 100 ft. to bottom. This unit provides gravity pressure on the treated water supply to meet all general requirements of the various processes at the mill.

3. FOR FIRE PROTECTION: The third 100,000-gal. elevated tank at the Fernandina, Fla., mill of Rayonier, Inc. is shown at the right. This unit, measuring 150 ft. to bottom holds a reserve for fire protection. The Rayonier plant is the first pulp mill to produce bleached sulphite pulp from Southern pine, and has an annual capacity of 64,000 tons.

● ***Other products we build for the paper industry include diffusers, liquor tanks, wash water tanks, reservoirs, steel smoke stacks, steel pipe, bins, digesters, and flat bottom tanks for all types of liquid storage. Please write for information or quotations.***

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EDITORIAL

Paper is a Prime Purchase

▸▸▸ WHILE THE BUYERS AND CONSUMERS in the United States were sitting quietly on the side lines, listening to the threats of the immediate annihilation of England being broadcast to the world during the month of July, and watching the little blitzkriegs being broken up and chased back across the Channel every day for weeks, industry kept right along making gains. Today, steel is doing over 90 per cent of capacity; in the Chicago district, 97 per cent. Refrigeration is making a new all-time high record. Automobiles are in superb condition and going into the fall with less cars on hand than any previous period. Airplane production and shipbuilding have backlogs running into hundreds of thousands of dollars. June employment of labor shows a gain of 900,000; and six months' profits for this year shows a wide margin above those of a year ago. These basic and many other divisions of industry are all on the up and up.

Such is the picture of a revitalized industrial machine in this country. But, the real effect of the program for adequate armament of the United States is yet to come into the industrial composite. That it will result in the most intensive activity this country has ever seen is only stating a potent fact from the indices already at hand.

War psychology has gripped the fancies of the average Americans. They are fascinated by the "impending" air raid on England. They are so intent on listening and watching for "the German blitzkrieg" that they are missing the industrial blitzkrieg which is right now hovering above them and will burst forth in full diapason ere August has gone.

Already, wise merchandisers are trying to place orders ahead of the industrial "Putsch." Advance in prices to care for added labor and tax costs are sure to come. Delays in shipment of needed goods are already a certainty.

With biggest fall volume business ahead of us and lowest general stocks of commodities in resellers' and consumers' hands, a bottleneck of unprecedented extent is as sure as the bottleneck of red tape which is delaying the production of war planes.

The paper industry is particularly vulnerable. The paper industry of the United States has been carrying the load of a world demand in face of a drastic decline in world production of pulp and paper. The world demand will continue to come here just as long as the British fleet controls the Atlantic Ocean and at present writing it looks as though that control will continue for an indefinite period.

On the average, thirty days shipment is the best delivery obtainable from mills in this country at the bottom of the summer dullness, and merchants and consumers are still out of the market for fall stocks. War, or no war, *paper is a prime purchase* now.

Obsolescence

▸▸▸ TODAY'S WORLD is a scene of rapid and important changes. It seems that with every rising and setting of the sun that something of world-wide interest and of tremendous import has taken place. Of course, throughout the ages, there has been change, constant change, but probably never before have changes come with such rapid-fire frequency as today.

Just as the world scene changes from day to day, so it is with the industrial picture, specifically the pulp and paper picture. Perhaps this picture doesn't change quite so rapidly as the world scene, but it is just as definite and sure.

No longer can the mill executive, engineer, or technologist think only in terms of depreciation. He must also consider that more elusive factor known as *obsolescence*.

Depreciation of equipment and buildings proceeds slowly; it can be determined with fair accuracy; and it can be provided for in the ordinary functioning of a business. Obsolescence, however, is not so easy to estimate.

New process developments, new machinery, market changes, individually or collectively, may render obsolete a unit that is giving satisfactory operation otherwise.

To be truly successful, any mill organization must be alert constantly for changes that are occurring—changes in equipment, in product, even in competition—in order that suitable action might be taken to combat obsolescence successfully.

Research and Prosperity

▸▸▸ DR. KARL T. COMPTON, president of the Massachusetts Institute of Technology and chairman of the National Association of Manufacturers Advisory Committee on Scientific Research, recently stated that the future of America depends largely upon industrial research. Industrial research, he said, not only pays dividends to the companies which engage in it, but it is a major new source of national prosperity, and its potentialities are unlimited.

If all the companies in the United States spent two per cent of their gross income for research, Dr. Compton reported, the total would amount to more than a billion dollars a year—probably five times as much research as is being done now.

Where does the pulp and paper industry fit into this picture? What percentage of the gross income of your mill is spent for research? In ascertaining this figure, do not confuse the amount expended for technical control work with that spent for research. Does the research appropriation amount to the two per cent suggested by Dr. Compton, or is it less than that figure?

Perhaps your mill is one in which the research budget amounts to more than 10 per cent of its gross income. If the budget is that large, your mill may be considered as an outstanding leader in industrial research since a recent survey of the National Association of Manufacturers Advisory Committee on Scientific Research revealed that only ten companies out of one hundred and eighty-eight were in that class.

The pulp and paper industry probably has made greater technological advances during the past decade than during any similar period in its history. These advances have come about through the joint effort of the industry and of the allied industry. Further advances are in the making. No industry can stand still for long. It either progresses or retrogresses. Therefore, do not let any sense of smugness jeopardize the future of your organization. See to it that your mill does its share of research, and research will do its share for the mill.

ADVERTISING PAGES REMOVED

Current Thought . . .

JUST A MOMENT, PLEASE!

WILLIAM SIBLEY

▶▶▶ A COUPLE OF WEEKS AGO I had the pleasure of receiving a splendid example of typography and printing in the form of a little sixteen-page pamphlet which bore the title: "Just a Moment, Please!" and the signature of Fred A. Dibble, 280 Madison Avenue, New York, N. Y. On the title page there was penned the inscription "To William Sibley, Philosopher—From Fred A. Dibble, 1940." That inscription was a new experience for me. I have been called a lot of things during my forty-six years, most of which were by no means so complimentary, but never before have I been called a "philosopher."

Not because of the penned compliment, but because of real interest in the solid meat contained in Mr. Dibble's little bundle of leaves, I read every single paragraph it contained. And because I gained thereby so much real enjoyment I am going to pass along some of his good thinking to you. Here for instance:

▶▶▶ "What do fishermen do in winter, was asked of an old Cape Cod fisherman? To which he replied, 'Sometimes we sit and think, and sometimes we just sit.' I wonder whether some of us do not 'sit' a lot more than we 'think'! And yet thinking is at the bottom of all progress. Move over a little, please. I want to sit down and think.

▶▶▶ "Tolerance is the silken cord upon which the pearls of culture are strung. There never was a time when the virtue of tolerance had more important work to do. Most of us have a little too much acid in our systems and sometimes we try to spit it out rather spitefully. That is not the best way to get rid of acidity. It should be neutralized before it is ejected.

▶▶▶ "The fear of what the neighbors will think and say keeps many of us in the narrow way. We are guided by public opinion to a very large extent. Fashion keeps us in line with an iron grip no matter how silly the fashion may be. We observe the conventions because of their general acceptance, even though they may be absurd. Take the way women dress, from shorts to train dresses the same day. Could anything be more fantastic? And yet we accept such antics as quite proper.

▶▶▶ "We might all be super men if we would follow out a very simple plan. If each of us would do promptly all the things that we know we should do; and leave undone all of the things that we know we should not do, every day, we would shortly find ourselves able to accomplish wonders. Write out each day a program of 'must's' and 'don'ts' and then carry them out.

▶▶▶ "That we are as a nation is a combination of what we are as individuals. No people is greater than the sum of its units—as men and women.

▶▶▶ What we think and say and do go to make up the public opinion of our day. Do we half appreciate this fact? There are very few things that just happen. Most events are the results of the pressure of what has been, and we move to make things more comfortable. We seldom disturb things just for the fun of it.

▶▶▶ "It is so easy to find fault with life and its events, but does it ever help us to get on better? No, it doesn't. Let's take a pride in seeing the good in events and people. Let's be like the old man who always spoke well of everyone. Eventually the meanest man in the community died and the neighbors offered bets that Old Uncle Josh couldn't find anything good to say about the late departed. So they asked him to find something good to say of this man. He thought for a minute or two and then said, 'He was an excellent smoker.'

▶▶▶ "One trouble with self-made men is that they are so well pleased with the job they have done that they usually worship their maker. Too much success seems to create a sort of fog in which it is very difficult for a man to get an unbiased picture of himself. The high spots are so prominent that in his mind he loses the modifying value of the low spots. Only the average counts.

▶▶▶ "I wonder if too many of us do not accept the world as we find it as some divinely ordered scheme that should not be tampered with? Only those who challenge this view ever create anything new. The courage of the man who ate the first oyster was probably inspired by an unsatisfied appetite, which prompted the experiment.

▶▶▶ "Do you ever invent alibis and use excuses when you get in a tight corner? Most of us do. I wonder if we fool anyone else as fully as we do ourselves by such devices? Probably not. It is only our lack of courage to face a situation that prompts us to use the subterfuge. The ostrich who hides his head in the sand doesn't protect himself, nor do we accomplish much more than he.

▶▶▶ "The real, priceless, and enduring values of life are the simple, homey, and attainable things that come within the reach of everyone if he be animated by the proper spirit. It is remarkable what a well-spring of good will exists in the ordinary man when something comes up that touches him. The generosity of the poor to those who may be worse off is amazing. They will share their last dollar if the need arise."

Vocational Training

for Pulp and Paper Workers

W. L. CASSIDAY, Pulp and Paper Instructor*

▸▸▸ A GREAT MANY PULP AND PAPER WORKERS are eager to advance to more profitable positions, and welcome an opportunity to better prepare themselves for such an advancement. In order to be qualified for promotions when vacancies occur, they desire to enhance their knowledge of their own daily occupation, of other jobs to which they may aspire, of the interrelation of the several departments of the mill, and of the entire pulp and paper industry in general.

A survey of the workers who had been studying voluntarily the manufacture of pulp and paper in a vocational training program was made to determine their reaction to the instruction given. The returns indicated that in every case the individuals knew very precisely their desires and needs, that they had received even more information than they had anticipated, and that they were very enthusiastic about the entire program as it was fulfilling a long felt need. The instructors were pleasantly surprised with the frank and favorable comments.

Relatively few of the employees of the United States pulp and paper industry, however, are familiar with the ways and means at their disposal for improving their knowledge of their daily occupation. Fortunately, some of them have been provided with a private training program by their employer, which they have been free to attend, but these instances are still very infrequent. The majority of them have found it very difficult and somewhat discouraging to attempt to learn more about their occupation.

Recognizing the necessity and importance of a program for training workers for useful employment, in 1917, Congress passed the Smith-Hughes Vocational Education Act. This act provided for the promotion of vocational education, provided for co-operation with the States in the promotion of such education in agriculture, the trades, and industries; provided for co-operation with the States in the preparation of teachers of vocational subjects; and appropriated money and regulated its expenditure. To this extent, then, vocational education was subsidized by the Federal Government. Among those eligible to receive vocational education under the terms of the act are "adult workers established in their trade or occupation, who wish through increase in their efficiency and wage-earning capacity to advance to positions of responsibility" *(4)*. The instruction provided, however, must be supplemental to the daily employment of the workers, and lower than college grade. By the latter is meant that there shall be no educational entrance requirements, and that the instruction and training shall not lead to the awarding of any college degree.

Soon after the passage of the Smith-Hughes Act, the first vocational training program for the personnel of the pulp and paper industry was instituted in 1920. Even though their beginning dates back some twenty years, only within the last decade have the programs been made available extensively throughout the industry. At present, however, full-fledged, well-rounded programs are being conducted in many important pulp and paper making localities in an ever-increasing number of states.

One of the author's classes taken at a recent dinner meeting at the Black River Country Club, Port Huron, Michigan. The large gold stars worn by some of the men were awarded in recognition of perfect attendance during the spring term.

Following the congressional enactment, it was necessary for the legislative bodies of the several states to formally accept the federal act, to make provisions for matching the federal funds with the required proportion of state funds, and to establish a state board for controlling and supervising the vocational education. The program then became available to all eligible to receive it.

More recently, in 1936, Congress passed the George-Deen Vocational Education Act "to provide for the further development of vocational education in the several states and territories" *(5)*. The underlying purpose of this act was to expand and strengthen the existing programs, and to initiate new ones by making more Federal funds available than those already authorized by the older act.

One of the latest states to join the ranks is Michigan. In January of this year, the first such program was put into operation in Port Huron, culminating months of envisioning, investigating and planning. After carefully observing its successful establishment there, other sections of the State of Michigan are now eager to institute similar training programs.

The Port Huron vocational training program was by no means forced upon

(*) Trade and Industrial Vocational Education Department, Port Huron Public Schools, Port Huron, Michigan.

the pulp and paper workers. On the contrary, the employees themselves took the initiative, and that is the only way in which such a program subscribed to voluntarily by the workers can be assured of success. At different times, various groups expressed their desires to their employers, not even being familiar with the fact that training courses could be made available to them through the co-operation of the State Board of Control for Vocational Education. The ultimate result was that an investigation of the possibilities was made. The next important step was the formation of a committee representing the three parties to the program, namely, labor, management and the Board of Education through which the State Board operates. The latter was represented by the superintendent of schools and the director of trade and industrial education. Since there are two mills in the city, the Dunn Sulphite Paper Company and the Port Huron Sulphite and Paper Company, the labor organizations and managements of each were duly represented.

After functioning to determine the educational and training needs of the industry, the committee recommended the setting up of an appropriate program and the procuring of a suitable instructor in co-operation with the State Board. Now that the program is a reality, the committee functions in an advisory capacity, co-operating with the instructor in determining and deciding upon the policies of administration. It meets regularly once a month.

A basic two-year course entitled "The Manufacture of Pulp and Paper" covers the many and varied manufacturing processes of the entire industry from raw materials to finished products in logical sequence. Among the topics discussed are pulpwood characteristics; wood preparation; pulp making; pulp testing; pulp washing, screening and thickening; bleaching; stock preparation; coloring, loading, and sizing; papermaking; paper testing; rewinding; finishing; converting; maintenance and repair; lubrication; and, power. Other courses are also available in the regular adult night-school classes likewise conducted by the Board of Education, such as boiler operation, blueprint reading, and shop mathematics. Following the basic course, specialized courses in foremanship training and job analysis are offered. In the latter, each department is taken as a unit and each operative job in it is analyzed from the standpoint of what the operator should be able to do and what he should know in order to do his work intelligently and to the best interests of himself and his employer. Special emphasis is placed on their relationship to the quality and quantity of the pulp and paper produced by the mill.

Provision has been made for the addition of special courses to the curriculum as the men express a desire or need for them. The policy in this regard is to leave the suggestion of new topics entirely to the enrollees, for they know best the ones that will be of greatest benefit to them. Already they have requested that a course in paper mill arithmetic or mathematics be included.

The classes meet in the Y. M. C. A. Building where a special room was outfitted by the two mills and the Board of Education. The equipment includes a 16 mm. sound motion picture projector and a Balopticon for projecting slides, photographs, sketches and diagrams.

The class meetings are of the open discussion or conference type, enabling each student to participate to the fullest degree. In order to promote the maximum amount of discussion, the attendance at each meeting is regulated to from twenty-five to thirty members; the same lesson is repeated several times each week. It is interesting to observe the improvements in self-confidence and self-expression that are manifest by the various enrollees from week to week in this type of meeting.

Classes are of two hours duration and are held both morning and evening for the convenience of the enrollees, many of whom are shift workers. Insofar as is possible supervisors and foremen serve as discussion leaders. Thus, at the same time, they actually are receiving a practical training in leadership and public speaking. Many photographs, slides, sketches and diagrams are used to illustrate the lessons. Whenever available, appropriate sound motion pictures are shown. Frequently, the class groups make an inspection trip into the mills to supplement the current discussion topic, thereby observing particular processes in operation and clarifying any misunderstandings or points of doubt.

At the request of the students, a written examination of the true and false type is given at the conclusion of each discussion topic. Each one corrects and grades his own paper, since it is solely for his own benefit that the quiz is given. The enrollees feel that these exams give them a personal check on the knowledge gained from the course, a review of the lessons, and an added incentive to be more alert and attentive during the discussion meetings. Most of the men are determined to write a perfect test and, surprising as it may seem, they derive a great deal of personal satisfaction from telling their fellow workers about it when they do attain a high grade.

Mimeographed lesson pamphlets are handed out at the close of each meeting. They contain a detailed write-up of the discussion topic appropriately illustrated with flow diagrams and sketches, reading references, thought-stimulating questions pertaining to the topic for the following week, and announcements. The men treasure them very highly and study them carefully at their leisure. The pamphlets enable absentees to make up for their absences and keep up with the lessons. By accumulating the pamphlets from week to week each enrollee gradually acquires a complete textbook, providing him with a ready reference for years to come.

The basic course is divided into six instructional units, each of twelve weeks duration and comprising twenty-four hours of instruction and training. All enrollees who attend at least seventy-five per cent of the meetings of an instructional unit are awarded a Certificate of Achievement issued by the State Board of Control for Vocational Education. All enrollees who complete all six units are awarded a diploma for the entire basic course.

At the conclusion of the school year, all who have qualified for a certificate are the guests of their employers at a special dinner meeting. The latter take this means of expressing their appreciation of their employees' participation in the training program, as well as their own part in it. Following the dinner, short talks are given by representatives of management, labor, and the local and state boards, and the certificates are presented.

Years of experience have proved that all three parties to a vocational training program are benefited by it. G. W. Phillips *(3)*, of the Champion Paper and Fibre Company, states that, "As a result (of their program), hundreds of employees have been trained for better jobs, and have been promoted to more profitable positions." Enrollees in the Port Huron courses say that, by broadening their knowledge of their daily occupations, they are finding their work to be easier and more interesting. They are learning more about what they are doing and why they are doing it, and how their own particular operations fit in with other manufacturing operations. By studying to qualify themselves for advancements they are increasing their potential earning power, and at the same time they are providing for the future welfare of their families.

A deeper understanding and greater co-operation are developed between labor organizations and management. The two are brought into more com-

(*Concluded on page 464*)

Automatic Freeness Recording

ARTHUR B. GREEN

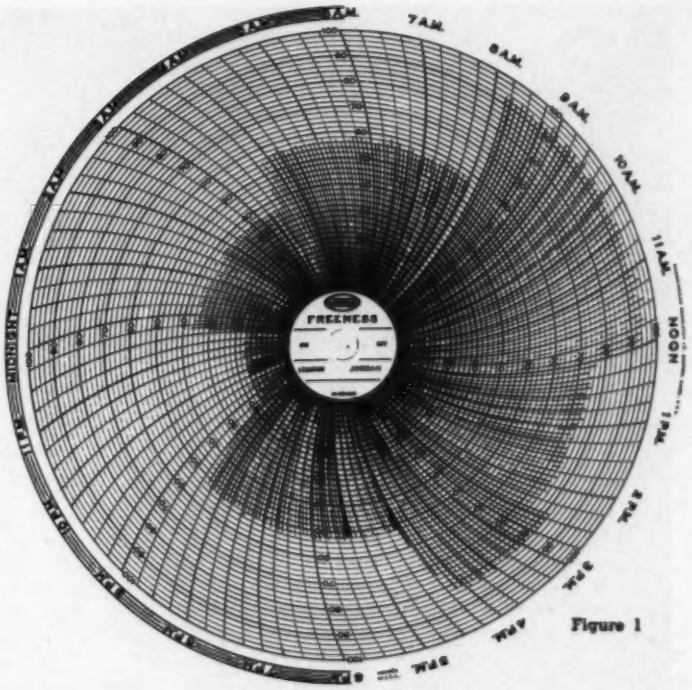


Figure 1

▸▸▸ WHEN IT COMES TO THE FACTOR of freeness, what the industry has been needing is a way to measure and show it in front of the men whose job is to produce it. For some twenty-five years there has been an increasing use of the laboratory for the determination of freeness, the tool being a laboratory instrument, the procedure starting with a sample taken by somebody from the stock at some point in the manufacturing process. A few mills, impatient to get freeness before the men on the beater room floor, put the laboratory instrument in their hands and have them do their own sampling. Without going into the slips and pitfalls of all this when considered as a piece of mill management or control, the laboratory method, whoever carries it out, is slow and the results are spotty and periodic. The work costs something in labor, even where the beaterman himself does the testing, and the beaterman could be better occupied working on the stock. Most surprising of all, and not the least important, is the simple fact that very few men know how or take the trouble to get samples that represent the stock, particularly when they have it day in and day out, month after month. Taking a good sample is a trick in itself, and handling it properly after it is taken is another, and any competent person who will go from mill to mill will go far before he will find one well trained sampler among the hundreds who make their routine passes at it. But with all the slips and pitfalls, errors and omissions, that go with a too-monotonous use of the laboratory instrument, the twenty-five years of its history have made the industry freeness-conscious.

Using Freeness

There are at least two ways to profit from a knowledge of freeness. The laboratory, withdrawing stock in the shape of samples on which to make freeness determination in the course of laboratory study, can run down any number of questions that arise from the mill and from the market, and can further contribute new fundamentals to the arts that go to make up the mill processes. Through laboratory efforts it is possible to lift mill practice to ever higher levels of perfection and economy. As each new step in this direction comes from the laboratory, ready for incorporation into daily routine, one problem always arises among a lot of problems. That is, how to convert laboratory findings into daily work and hold the new methods steady from hour to hour.

Likewise, the mill, concerned first of all in getting out the tonnage and holding to necessary tolerances in doing it, can use freeness determinations as guides. If they are good determinations, obtained often and immediately displayed, they will be the means of running the mill to freeness specifications. The errors and omissions of manual sampling must be absent, and the results shown to the beaterman must come without help from him with mechanical accuracy and impartiality. To meet such requirements there have been many attempts.

Typical Record

These attempts have been disappointing, principally for one reason. In the laboratory type of freeness tester, there is a screen, and the sample of stock drains through it. At the end of that step, the screen is cleaned. The next test needs a screen as clean as the one used in the last test. Now, in converting from a repetitive test to a continuous test, the mistake usually has been in trying to use the screen continuously. Overlooking the variable condition of the wire covering on a cylinder washer, for example, a smaller round dipper has been rotated in the moving stock with some means of collecting and measuring the variable flow of water running to the in-

Figure 2

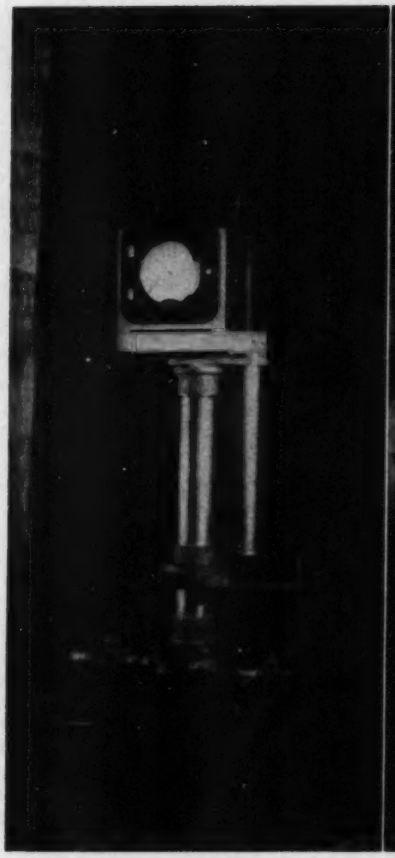


Figure 3

Figure 4

side through the fiber mat and the screen, thus showing the variations in freeness. Further, in any form of mechanical test that depends on measuring the drained water, there are difficulties that have not yet been met. Orifice and weir measurements run off in time, because the water is white water and deposits its solids and colloids.

Practically, it serves the purpose if, instead of the test being literally continuous, it is periodic, provided the periods are sufficiently short. Instead of trying for an uninterrupted flow of white water through mat and screen, let each test be separately made, as it is when done by hand, returning the instrument to its initial condition after each separate test. That gives a chart record typified by Figure 1. A line develops along the ordinate of the chart for each separate freeness determination. If the line is long, going high on the scale, the indication is of high freeness, under the proper conditions which will soon appear. Under the same conditions, if the line is short, going but a little way up the scale, the freeness indicated is low. On the specimen chart shown in Figure 1, there are six changes in freeness during the 24 hours, typical of the pleasure of making paper in the present day, when jobbers carry no stocks and mills do business at retail. But under those conditions of business, it becomes more valuable and not less, to be able to hit the freeness that is right for the order at once, and have it in plain sight, valuable to know what freeness is right for the order and to be able to post it for the beaterman on his order card.

On this chart the freeness determinations come about once every five minutes. As will appear from the mechanical details of the instrument, there is no attempt to make that timing precise, because that is not important, and exact timing adds some cost. What is precise is the working of the testing element, which is important.

Special Installation

The kind of unit that produces a chart like Figure 1 is shown in the unretouched photo Figure 2. Because the stocks and working stock densities and mill arrangements vary from mill to mill, the unit must be dimensioned, speeded, and calibrated differently for the different jobs; at least, that is the way to get highest sensitivity. In this case, the mill is one of the topsy-grown plants with beaters and jordans and chests set at criss-cross, with resultant surgings and air-bindings, and it was further necessary to wedge the unit in between two closely-set jordans, under a headbox platform, and bring the instrument dial above platform level between tests. By comparing the photo with the drawings in Figures 5 and 6, it is possible to untangle the instrument from its surrounding scenery. At any rate, the photo will place the unit in the flow box leading from the jordan, which is the simplest way to place it, and from a close look at the photo it will appear that the instrument is shown in its withdrawn, or top position, the position marked "Idle Position" in Figure 5. After each plunge, when a determination is made and recorded, the instrument rises to this "idle position," carrying with it the recording attachment with the record in plain sight.

Figure 3 is another unit, photographed in the shop before installing. The purpose of this view, coupled with Figure 4, is to relate the instrument itself with its drive and timing device, as these two are given separately in the drawings (Figures 5 and 6). In both Figures 3 and 4, the instrument is supported on a pair of planks, and those planks can be taken as two of the bottom planks in the constant level flow in which the instrument will stand when installed. The drive and timing device is below the flow box, out of sight when in the mill. Figure 3 gives the instrument in working, or testing, position; Figure 4 in top or idle position. Whereas the rise of the instrument in the special case given in Figure 2 is nearly seven feet, the rise which is necessary in the ordinary case is but a little more than the length of the testing element, which means a little less than three feet.

The Working Cycle

Turning to Figure 5, there is a cylindrical hydraulic ram, used as a lift, after the manner of the car lift in the automobile lubricating station. This passes down through the bottom of the flow box, where it connects with the drive and timing mechanism. The position of this lift between tests is given with dotted lines and designated "Idle Position." The position for testing is given in solid lines, and designated "Working Position." Every five minutes (approximately), the lift plunges at a fixed speed from idle position to working position. There it pauses long enough to put the testing element through its cycle; then it gradually rises back to idle position to stay until the next swift plunge.

The testing element is given in vertical section just to the left of the hydraulic lift and parallel with it. The

testing element goes through a secondary cycle like this: The outer cylinder, which is the screen, admits water through itself and the fiber mat which forms outside it. At first that inward flow of water is rapid. Then, as the mat forms, and as the water inside rises toward the outside level, reducing the effective head on each orifice of the screen, the rate of water flow diminishes. Thus the inflowing water produces a variable flow depending for its flow curve on the freeness, or slowness, of the stock (and on some other factors soon to appear). Central with the screen cylinder is a solid tube into which the inflowing water enters only at the bottom end. With a proper sliding fit within this tube is a spinner, so made that by opening or closing two louvres in its horizontal plane its speed of descent through water within the tube is fixed. Counter to the upward variable flow of water, then, is the downward uniform and predetermined rate of descent of the spinner. But as long as water rises inside the tube at more than the rate of descent through water of the spinner, the spinner will rise. At that one instant when the upward flow of water reaches exactly the same rate as the rate of descent of the spinner through water, balance takes place, and the spinner stops rising. Thereafter, the spinner descends. The top point of its rise has indicated the freeness determination.

Vertically upward from the spinner and supported on it is a light spindle carrying two buttons. The upper button determines the zero position of the spinner, at the extreme bottom of the central tube of the unit. That position is given dotted. The lower button is placed to engage the arm of the recording attachment at the right point to bring the readings within the scale of the chart. In the drawing (Figure 5) the supposition is that the testing unit is in the act of registering a reading at half-scale, which would appear as a reading of 50 on the chart shown in Figure 1. The supposition is that as shown in the drawing, the instrument is at the instant of making that determination and recording it, that the spinner and spindle have just risen to the maximum height of the test and are about to begin their descent slowly back to zero.

The instrument remains at the working position shown, with testing element submerged in the stock, long enough for the testing element to complete its secondary cycle and record its freeness determination; then the hydraulic lift begins the return phase of its own cycle and rises slowly to the idle position. There it waits for the end of the timed interval. At that instant the lift is tripped, another plunge is made, and the testing element repeats its secondary cycle, recording a new freeness determination. As the hydraulic lift withdraws the testing element slowly from the stock, the water which has been admitted to the inside of the screen cylinder flows outward again through the perforations of the screen. If the working density of the stock is well above 2 per cent, and the stock is not extremely slow or loaded with minerals and colloids, that outward flow of water washes the screen clear. If this washing action needs help, there are spray heads throwing knife sprays against the screen as it slowly rises, to complete the cleaning. Sprays also play on the plunger cylinder of the hydraulic lift, to insure that no spatter of stock sticks to it to interfere with its free operation.

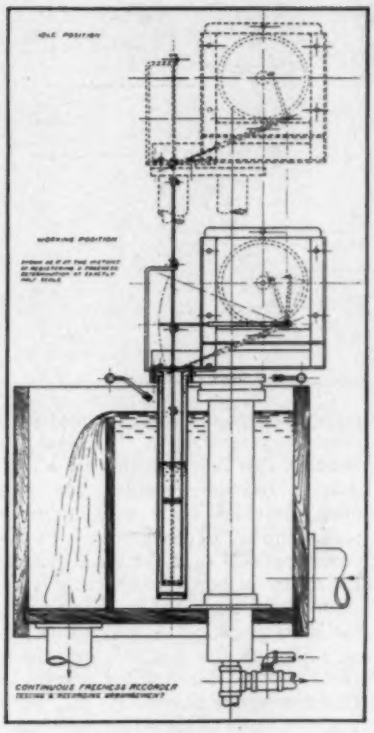


Figure 5

The Mechanism

Important to success is control over the speed of the hydraulic lift in both directions. That appears from a look at the drawing, Figure 6. Mounted on a base plate is a fractional horsepower constant speed motor, connected with a right-angle speed reducing train. Ordinarily, where standard electric currents prevail, the motor runs on the 110-volt 60-cycle circuit. Through a coupling and a second speed reducer, the rate of rotation is brought down to one-fifth r.p.m., or one revolution every five minutes, approximately. The purpose of this is to turn a cam, shown in full view at the right of the drawing, once every five minutes. A roller follower rides on this cam, which throws the lever of a lever-operated gate water valve above it, the motion going through a simple linkage. Between this gate valve and the base of the hydraulic lift cylinder, clear water is admitted continuously under a controlled pressure (say, 20 pounds per square inch). In that admission line, in order, are a hand valve, a strainer, and a pressure control valve.

When the follower rides the dwell segment of the cam, the valve lever is up, and the gate valve is closed. Then the water coming through the admission line raises the plunger cylinder of the hydraulic lift to its top position. While the lift remains at its top position, no water flows. While the lift is rising, the speed of rise is fixed by setting the opening of the hand valve. In that way the sprays playing on the screen and on the plunger cylinder can be given as much time as they need to do a thorough cleaning.

When the cam turns to the drop point, the point shown in the drawing, the follower suddenly drops, opening the lever-operated gate valve instantly. Immediately the lift descends. It comes down to its bottom, or working, position at uniform speed. That speed depends on the amount of opening of the gate valve. Through the gate valve, which is now serving as the exhaust port, runs the water let out from the lift cylinder plus the water continuously admitted through the admission line, so the gate valve must be enough larger than the admission line to allow a faster drop of the lift than will ever be desired. In the drawing, Figure 6, it is assumed that full opening of the gate valve is used, a condition that will practically never be realized. In practice, some opening less than full opening of the gate valve will be required. Under the lever which guides the cam follower (shown to the right in the drawing) is an adjusting post. As that post is lengthened, the valve opening is diminished. In that way the valve opening is set at whatever point the case requires, and the speed of the plunge is regulated. When the right setting for the water admission valve, and the lever-operated gate exhaust valve, have been found, they are kept constant. Particularly important is it to have the speed of the plunge constant, because that affects the reading. A fast plunge will register higher readings than a slow plunge. For that reason the adjusting post which regulates this factor has a lock

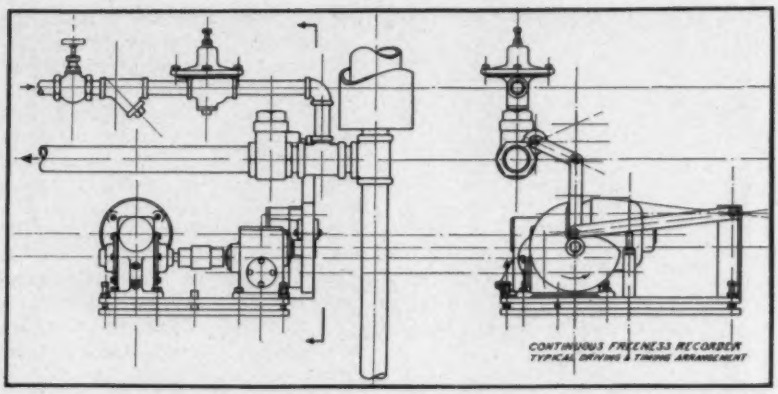


Figure 6

nut, which should be bound down very tight.

Looking at the base plate under the drive and timing assembly, three leveling screws appear. They provide a micro adjustment for level, coupled with a fine adjustment of height relative to the position of the lever-operated gate valve. The lower plate, which is the bearing plate, is supported suitably on a stand or pier provided by the mill, and the base plate is then leveled to the point that just allows for full opening of the gate valve.

Working Conditions

If a device is sensitive to variations in freeness, it measures the readiness of water to leave a body of stock. But water will leave stock less readily if the stock is thick than if the stock is thin, though the freeness when reduced to a common density actually may be the same. Again, water will leave stock less readily if the stock is cold than if the stock is warm, though the freeness when reduced to a common temperature may be the same. Consequently, there is no way of measuring freeness that will not be affected by stock density and stock temperature.

If the laboratory method is used for measuring freeness, the sample of stock is corrected for density and temperature before testing; otherwise tests would not compare. With those corrections, there is no question that the tester is giving freeness values. But set up an instrument in the mill and begin making determinations on the stock as it may be coming, and there is no certainty that the readings show freeness separately, unless the corrections are applied. In the mill, that is no tragedy. The fact is that a mill gains in many directions, in the directions of uniformity and economy, when the working stock density and stock temperature do not vary. Still, few mills start their stock preparation with control over density; few mills carry through to the machine with control over stock density; though many mills patch up the density errors at one or two points along the way with consistency regulators. Thus the fact remains, that before setting up a continuous freeness recorder, the mill must provide itself with uniform stock density, or be prepared to become confused over the readings. In the matter of temperature, there is little to guard against if the process water is coming from a river or system of wells, except that seasonal differences will call for seasonal changes in freeness specifications if the same grade is to be made winter and summer. But if the process involves steaming the stock, then temperature needs as close control as stock density.

The third working condition is constant level. If the stock is higher in the flow box, the reading will be higher, and the record will look as if the stock were freer. If the stock level drops in the flow box, the instrument will register as if the stock were slower. If there is air-binding in the spouts, or surging through the jordans, the stock level will rise and fall in the flow box, causing wild readings that reflect the surges as well as the freeness variations, and will mean nothing to a reviewer afterward. To make a constant level flow box proves to be no mean trick. Simple though it always appears beforehand, and simple as it actually is, more mills have to try more than once to achieve it than can do it the first time.

If there is constant level in the flow box, constant stock density within limits of five per cent total relative variation, constant temperature within ten degrees Fahrenheit total variation, then the continuous freeness recorder will register true within five points of the Canadian Standard Scale, which is closer than mill operation can be held by any other method. If stock density and temperature do not vary at all, the continuous freeness recorder will show variations in freeness within as close limits as any other method, whether mill or laboratory.

BUYING FOR PROFIT

W. F. SCHAPHORST, M. E.

▶▶▶ AN INSTANCE WAS brought to my attention recently of an executive who makes it a point to personally select all of his important machinery. First cost does not seem to bother him at all. What he is after is the best he can get. He spends thousands of dollars for a single machine without "batting an eye."

However, after selecting the machinery he seems to feel that his work is done and from then on purchases are made by someone else and are accomplished on a price basis. The executive simply tells his order clerk to buy the lubricant, the belting, and such things, and cautions the clerk to be "careful." The clerk forthwith thinks he is doing the best that can be done when he buys the lowest priced articles he can get. Like so many others he misinterprets Ben Franklin's old adage that "A penny saved is a penny earned." If Franklin were alive today he would doubtless amend that saying to read like this: "A penny wisely spent in first cost will save a hundred pennies."

As a result, belting in the plant is about as cheap and poor in quality as can be obtained. Little regard is given to its strength, its flexibility, its coefficient of friction, its surface adaptability, its elasticity, its thickness, its waterproofness, etc.

As for lubricating oil, methods followed in the purchase of oil are even more deplorable than in the purchase of belting. Poor lubricant not only causes fuel loss and production loss but, worse still, it permits an expensive machine to wear itself out in a short time. Poor belting, at least, does not cause internal machine wear whereas poor lubricant does.

If the executive mentioned would make a careful study of the importance of proper lubrication and the differences that exist in oils, he would make it a point to personally select the best oil obtainable. He would specify the oil and would tell his order clerk to buy that oil, and no other. A penny saved in first cost is *not always* a penny earned.

Champion noonday group. At the extreme left is H. A. Helder, mill manager. Next to Mr. Helder is Reuben B. Robertson, the author.

Engineers of Progress

REUBEN B. ROBERTSON, Executive Vice President
The Champion Paper and Fibre Company

EDITOR'S NOTE: Mr. Robertson tells the story behind the organization of what is believed to be one of the first industrial noonday conference groups, if not the first such group, to be organized by an industrial executive. Its success is evidenced by more than 30 years of continuous functioning.

▸▸▸ THE NOONDAY CONFERENCE GROUP of executives of the Canton Division of The Champion Paper and Fibre Company was organized at Canton, N. C., in 1907.

The plans for the Canton mill were developed during a period of prosperity and of optimism; the mill was brought into production in a period of despondency and depression.

Among other things, we were endeavoring to produce a commercial pulp from chips that previously had been subjected to an extraction process for the removal of tanning extract. The process was at that time new and practically untried, as far as commercial operations were concerned. We were developing a pulpwood timber supply from an area that never before had produced forest products of the sort. We had an unusually wide diversity of activities, a broad range of new and difficult problems and a group of executives who never before had worked together as a unit.

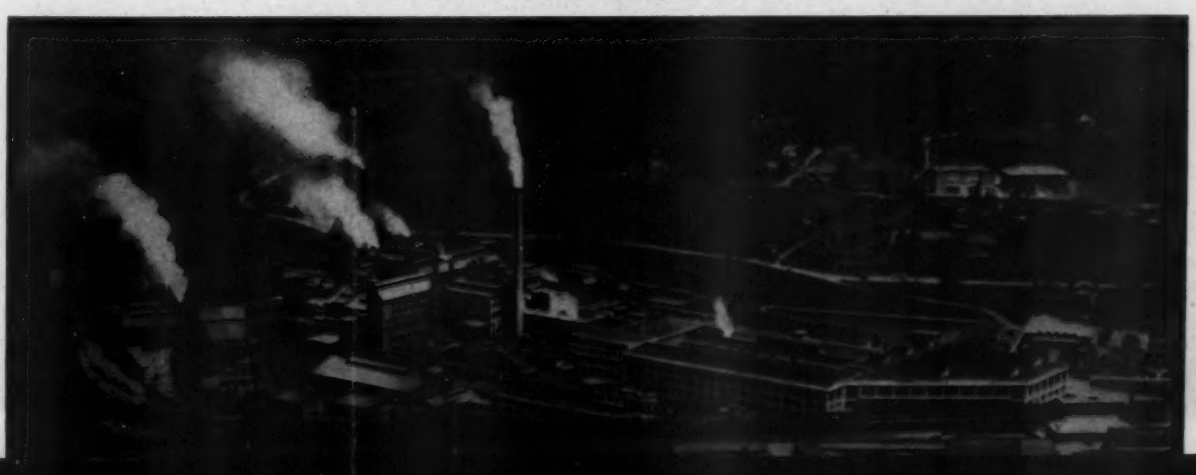
The depression conditions prevailing made it vitally important that a maximum of co-ordinated effort be obtained in the shortest possible time, and the noonday executive group, later known as the "Dinner Crowd," was arranged as one of the *tools* of management in the building up of group morale and to produce better team work.

The ten or twelve executives employed at that time had been in the habit of scattering to their homes for lunch; and as the noon hour seemed the most convenient time for our suggested daily conference, the management proposed that lunch would be served at company expense with the understanding that, after the important business of satisfying the demands of the inner man had been taken care of, the remainder of the noon hour would be devoted to the discussion of mill problems.

Attendance never has been formally compulsory, and no suggestion of compulsion has been needed. The noon conferences have been informal, friendly, and interesting, and attendance has been looked upon as a privilege to be anticipated with pleasure, rather than a dreary routine duty.

These frequent daily contacts across the luncheon table created an atmosphere of friendliness and comradeship which had not existed before and which has gone a long way toward suppressing the interdepartmental jealousies, which so often spring up in large organizations to plague the management and to interfere with team work.

A fine aerial view of the Champion plant at Canton, N. C.



The plant manager always has served as discussion leader, with another member of the group serving as secretary, frequently allocating definite subjects of general interest for discussion on certain days of the week. For instance, in the Champion conferences at Canton, Tuesday, for many years, has been the day for a discussion of safety, for the examination of the safety record of the past week, for planning an improved record for the ensuing week. A spirit of good humored departmental rivalry in such matters is encouraged by the display in the conference room of graphic charts showing the record of each department.

The members of the executive group are necessarily the "Engineers of Progress" and we ask each of them at the end of each month to state before his fellow executives what has been accomplished by his department beyond the ordinary routine.

At the conclusion of the year it is customary to review and to summarize the accomplishments of the past year, and at the same time to chart the executive program for the coming year. At frequent intervals during the year the chart of "aims" is re-examined to measure progress, to eliminate projects that may have been proved to have no value and to supplement the "aims" with new projects that may have developed in the meantime.

Topics other than safety, for instance, personnel problems, research and production scheduling, occasionally consume entire noonday sessions. Group discussions of scheduling have been especially helpful in a mill where many departments are interrelated as to power, steam, water and pulp flows. The accurate timing of the starting and stopping of processes at week ends and holidays, arranged in these conferences, has evolved very substantial economies in both labor and raw materials and also has made possible a more economical planning of that troublesome feature of paper mill operation, *maintenance*.

While in the main, noonday discussions are confined largely to topics of general interest, leaving problems affecting a specific department only for individual discussion, still no rigid rule against discussions of the problems of an individual department has been adhered to, and it is frequently found that the most valuable suggestions come from department executives having no direct connection with the process under discussion.

Frank and friendly interchange of views on such matters permits Champion to avail itself of the combined intelligence of its best thinkers.

Another advantage of the daily meeting of the executive group that is of no small importance lies in the fact that the chief executive can, with the minimum loss of time, see and converse with all of his associated executives every day, thus bringing to him the latest word from "out in the mill," and to the other executives the latest word from the main office, thus avoiding the isolation and the *insulation* which often leads to mistaken action.

Vocational Training

(*Continued from page* 458)

plete accord when working toward a common goal. Employers appreciate the difference between "skilled workers" and "trained skilled workers" and know that the latter do their work better and are, as a consequence, a more valuable asset. Management is further benefited by the improvement in the quality of the product, and frequently by increased production rates because of the reduction of losses caused by imperfections. In many instances, operating expenses are reduced because the workers are educated to the value of the materials and equipment with which they are working, and are, therefore, more inclined to strive toward eliminating costly wastes. Soon all well-organized, progressive mills will regard vocational training for employees as an indispensable necessity.

Good will is fostered between the mills in the community, and they are brought into closer harmony by a cooperative vocational program. The public relations of the school systems is strengthened by demonstrating to industry that it can be of valuable assistance in conducting adult classes, and that educational interests are not confined to the children in the day schools.

Those who are desirous of obtaining a vocational education program for their community, should consult the local superintendent of schools regarding the formation of an advisory committee of the type previously mentioned. After the latter has determined the training needs, an application can be made to the State Board of Control for Vocational Education for its cooperation in formulating and setting up the program. A government publication that will be of valuable assistance is entitled, *Vocational Training for the Pulp and Paper Industry. A Job Analysis with Suggestions on the Organization and Operation of Training Programs (1).*

In devising and conducting courses of study the desires and needs of the workers always should be kept foremost. The men should be given the information they want and in which they are interested—not that which someone else thinks they may need or should have. Instructors should be alert to detect any lack of attention or decrease in attendance caused by this, and correct it immediately if the program is to succeed. The too-frequent use of technical phrases and terms must be avoided. Lectures, explanations, answers, in fact, all statements made by the instructors or conference leaders in the discussion meetings must contain only simple language completely understandable by all, regardless of their educational background. Too many involved chemical equations will scare some away; they must be used very sparingly, if at all.

With regard to the value of a better education for those engaged in the pulp and paper industry, the Joint Textbook Committee *(2)* states very pertinently, "We realize that a course in drawing will not make an architect out of a bricklayer, but he will be a vastly better bricklayer if he has learned the principles of the arch and can read a blueprint. So with our industry, study alone will not make a superintendent or manager of a back tender or an acid maker. But we can have better pulp and paper makers and shall have better pulp and paper when all in the industry know the connection between steam pressure and temperature, lignin and cellulose, humidity and evaporation, surface tension and foaming, elastic limit and the life of wires and felts, etc. It is worth while for a workman to be a better pulp or paper maker; it is worth while for an executive to have better workmen; it is worth while for a man in any position to qualify himself for a better one."

Literature Cited

1) Federal Board for Vocational Education. Bulletin No. 168 (1933). Superintendent of Documents.

2) Facilities for Correspondence and Class Instruction in the Manufacture of Pulp and Paper. New York, Joint Textbook Committee, April, 1940. 11 p.

3) Phillips, G. W. Training for Better Jobs. *Paper Ind. and P. World* 22, no. 1: 43, 48 (April, 1940).

4) United States Office of Education. *Vocational Education Bulletin* No. 1 (1937). p. 6.

5) *Ibid.* p. 91.

Acknowledgment—The author acknowledges the valuable suggestions of F. W. Dalton, Chief, Trade & Industrial Education Division, Michigan State Board of Control for Vocational Education.

Approved for publication by the Michigan State Board of Control for Vocational Education, George H. Fern, director.

Vacations *with* Pay *do Pay Dividends*

The light, pleasant offices of The Upson Company where the author (seated at desk to the right) deals with administrative matters. W. H. Upson is seated at desk to the left.

CHARLES A. UPSON, President
The Upson Company

▸▸▸ THE UPSON COMPANY is proud of having been among the first —if not the first—to institute a plan of standard vacation-with-pay for mill and office workers. In April, 1923, *Factory* magazine carried an article describing the plan which had just been put into operation. The publication of this article was no doubt responsible for the adoption of similar vacation plans by many other companies.

For years The Upson Company has been the largest manufacturer of fibre wallboard in the world, under one roof. The company also manufactures high-grade boxboard specialties.

The adoption of the vacation plan for mill workers as well as office associates was brought about as the result of a firm conviction on the part of the officers that the factory worker deserved a rest from his daily duties fully as much as the executive or clerical worker in the office. Mill workers, being paid an hourly rate for their services, naturally do not receive remuneration for lost time due to illness, while executives, associates, clerks and stenographers are seldom refused their full salary checks in cases of enforced absence. This is one of the many reasons why the officers originally extended the vacation-with-pay throughout the mill and why mill employees appreciate it as they seemingly do.

As originally conceived, the plan provided for vacations in the factory on the following basis:

1 year's service....	2 days' pay
2 years' service....	4 davs' pay
3 years' service....	6 days' pay
4 years' service....	8 days' pay
5 years' service....	10 days' pay
6 years' service....	12 days' pay

Naturally, in the course of time the above schedule has been modified to meet conditions. During the past few strenuous years, some mills have reduced the length of vacations from two weeks to a single week.

The task of closing down for a week or two may appear at first to be a troublesome and costly one. Details must be considered and emergencies must be anticipated, but once the procedure is established, everything runs smoothly. The latter part of July is usually chosen for mill and office vacation. Customers are notified of the vacation date, and have always cooperated in sending orders in advance so that they may be filled promptly. This also reduces the number of "rush" orders which must be handled by the skeleton force retained in the office for emergencies. Mill production is scheduled far enough in advance so that the vacation period is kept free and stock on hand is sufficient to fill normal requirements. Companies which supply raw materials are also notified of the mill vacation so that deliveries can be made either before or after the shutdown.

During vacation, the mechanical crew is retained in the mill to make repairs. In this way, the vacation serves a double purpose. It is usually necessary to close down a mill for repairs at some time during the year and usually a week is required to accomplish the work. While the workers are on vacation, the repair crew goes over the boilers, machinery and equipment and everything is made ready for more efficient operation when the mill starts up. Members of the mechanical department take their vacations after the other workers return. By combining the annual shutdown for repairs, the vacation does not mean time lost.

While mill workers all receive a full week or two of rest and change, the number of days for which they actually receive pay is based upon length of service. Naturally, an employee of twenty years' standing is entitled to more than one who has been connected with the mill for only six months.

The management of The Upson Company believes that the mill-wide vacation plan is a valuable investment in employee good will. Certain it is that labor turnover has been comparatively small. Records of long association on the part of some individuals speak for themselves. The vacation gives the worker time for rest and relaxation to which he might never attain otherwise.

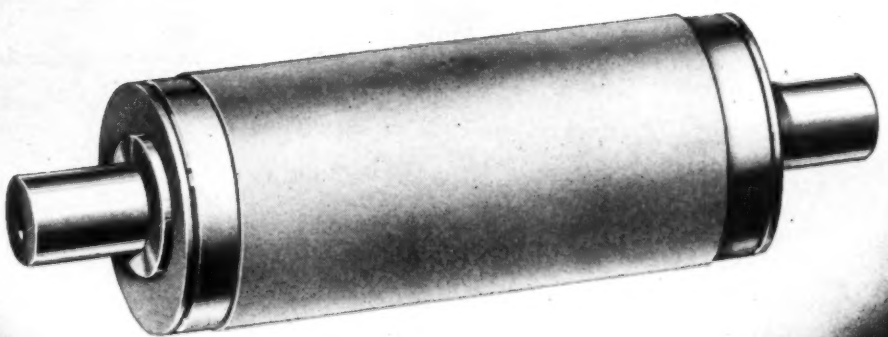
Experience has proved that employees no longer care as much for picnics, parties, baseball and bowling teams and other so-called "welfare" expedients. But they do appreciate their vacations. Needless to say, the benefits are reflected to The Upson Company in a multitude of ways—through a more unified working force, more efficient production and less waste. Above all, there is a continued spirit of loyalty on the part of employees. This "intangible" evidence has perhaps played the largest part in influencing the management to continue its vacation policy for almost twenty years.

PAPER SKETCHES

The NORTHERN BLOCKADE DURING THE CIVIL WAR DID NOT PREVENT GOOD PAPER, MADE IN EUROPE, FROM REACHING THE CONFEDERATE MARKET.
THE FIRST RECORDED CONTRACT FOR AMERICAN-MADE PAPER WAS THE 10-YEAR AGREEMENT MADE IN 1697 WHEREBY RITTENHOUSE, GERMANTOWN PAPER MAKER, AGREED TO FURNISH BRADFORD, PHILADELPHIA PRINTER, WITH A YEARLY SUPPLY OF "SEVEN REAMS OF PRINTING PAPER, TWO REAMS OF GOOD WRITING PAPER, AND TWO REAMS OF BLUE PAPER."
AS A WAR CONSERVATION MEASURE RECEPTACLES ARE PROVIDED ON LONDON BUSES AND TRAMWAYS FOR THE DEPOSIT OF USED TICKETS. BRITISH AUTHORITIES EXPECT TO RETRIEVE 4 TONS OF WASTE PAPER DAILY IN THIS MANNER.
3 PENCE
TEN SHILL
THE PRICE OF A POUND OF PAPERMAKING RAGS, DUE TO THE REVOLUTIONARY WAR, SKYROCKETED FROM 3 PENCE (ABOUT 6 CENTS) IN 1774 TO 10 SHILLINGS (ABOUT $2.40) IN 1781.

A bright spot
in any calender

PERKINS



B. F. PERKINS & SON, INC.

ENGINEERS AND MANUFACTURERS

HOLYOKE - - - MASSACHUSETTS

ASSOCIATIONS

Tappi MEETING TO BE STREAMLINED

▶▶▶ "STREAMLINED" is to be the keyword of the 1940 Fall Meeting of the Technical Association of the Pulp and Paper industry, according to pre-convention reports of activities now in progress on the West coast. From the moment members and guests of TAPPI start arriving in Seattle on August 20 for their four-day stay there'll be things to do—things to see—and plenty to learn; all of which will be under the guidance of General Chairman G. S. Brazeau and his able co-chairmen.

The choice of the Pacific Northwest for the 1940 meeting is considered most timely and significant since, it is said, the eyes of men in the paper industry have been upon this section of the country as a primary source of sulphite pulp since the European war began last September. In 1939, Oregon and Washington produced nearly 40 per cent of all the sulphite pulp manufactured in the United States. The holding of the TAPPI Fall Convention in Seattle offers an unusual opportunity for the paper mill men throughout the country to visit the industry on the Pacific coast and to hear some excellent papers dealing with technical and operating subjects. Needless to say, the '40 meeting also offers an ideal vacation trip for many of the technical men as this region is always cool in the summer.

The technical program will cover the first two days and the second night of the meeting. The meetings will be held on the University of Washington campus. On the third day there will be a trip into the big timber where everyone will have an opportunity to see how the raw material for the pulp and paper industry is harvested. On the fourth day there will be opportunities for recreation and mill visits.

"This is to be a streamlined technical meeting with the heavy emphasis on the practical benefits that will come to those who attend through their participation," Mr. Brazeau remarked. "Despite the stressing of the quality of the technical program there will be no lack of opportunity for diversion and relaxation."

Of outstanding interest on the technical program will be the symposia on lignin and timber resources, two subjects of great interest to the industry. Other subjects to be discussed informally at the group dinners include "Acid Pulping and Bleaching," with W. Norman Kelly, manager of the Longview Mill, Pulp Division, Weyerhaeuser Timber Company, as group leader; "Alkaline Pulping and Bleaching," Dr. Carl E. Curran, chief of the Pulp and Paper Section, U. S. Forest Products Laboratory, Madison, Wisconsin, heading the group; "Power," under the leadership of Henry W. Beecher, power plant engineer, Seattle; "Applied Hydraulics," R. V. Bingham, president of the Bingham Paper Company, Portland, as group leader, and "Paper Machine Problems," under the direction of R. S. Wertheimer, resident manager and secretary of the Longview Fiber Company. The lignin symposium will be presided over by George H. McGregor, superintendent of the Longview Mill, Pulp Division, Weyerhaeuser Timber Company, while the forest resources symposium will be under the direction of Professor B. L. Grondal, college of forestry, University of Washington.

The TAPPI Special of the Northern Pacific leaves Chicago at 11 P. M., August 16. It will lay over in Livingston, Montana, on Sunday, August 18. On that afternoon the Northern Pacific is sponsoring a real western rodeo as entertainment for the guests on the special. William A. Geiger of Chicago, chairman of the TAPPI transportation committee, stated that interest is running high and that reservations, if not already made, should be made immediately.

Upon arrival of the special train at 8 P. M. Monday, August 19, an informal reception will be held at the Olympic Hotel to provide easterners and westerners a chance to get acquainted before the work begins Tuesday morning. Tuesday evening, August 20, there will be an informal dinner and dance at the Olympic.

In addition to the woods trip there have been many entertainment features planned. If you are an early riser or if you want to catch a big Puget Sound salmon badly enough to become an early riser, you may take part in a "Salmon Derby," a sport which originated in Puget Sound. If you'd rather golf than fish, the Entertainment Committee has arranged a tournament on one of the most beautiful courses in the country. All of this takes place on the fourth day after the serious business is over.

The ladies haven't been overlooked in the plans either. Chairman Ray Smythe has many activities planned for the fair sex although, as he says, "we aren't going to tell them everything before the meeting as we believe that they like to be surprised." At any rate it is known that the ladies will be taken on a boat trip on Puget Sound through the famous San Juan islands to Victoria, the capital city of British Columbia, known as "a bit of old England." Sightseeing trips will include the places of interest in Victoria. Chairman Smythe requests the ladies to bring with them proper identification to avoid difficulties with the Canadian and American immigration officials when entering and leaving British Columbia.

Another feature of the 1940 TAPPI meeting which will be exclusively staged for the feminine representation will be the fashion show of fall models. This will take place in the auditorium of Frederick & Nelson's, leading Seattle department store. A dozen beautiful models will exhibit a half hundred of the latest creations of fashion designers. Following the fashion show, Miss Florenz Clark, internationally known artist, will talk on commercial art and illustrating. This in addition to special golfing facilities and sightseeing tours will make up some, but not all, of the ladies' agenda.

It is also noted that the Pacific Coast Division of the American Pulp and Paper Mill Superintendents Association is actively supporting the 1940 Fall Meeting of TAPPI. Anton P. Siebers, chairman of the division, is assisting in arranging the dinner meeting devoted to Paper Machine Problems and other superintendents are also taking an active part. Most of the Pacific coast superintendents are planning to attend.

Thus with the enthusiastic co-operation of the Pacific coast pulp and paper industry plus the hard work and management of the Advisory Committee, Convention Committee and their subcommittees, the 1940 Fall Convention of TAPPI is expected to go on record as one of the "best ever." The dates of August 20-23 will undoubtedly live long in the memory of many a technical man as pleasurable and valuable days.

REDUCE STEAM COSTS
INCREASE OPERATING EFFICIENCY

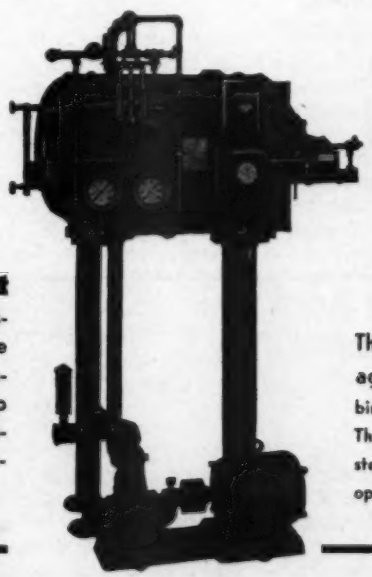
MANY MILLS ARE ALREADY OBTAINING THE ADVANTAGES OF THIS NEW AND IMPROVED STICKLE EQUIPMENT

The Stickle Automatic Differential Valve (below) controls exact differentials in pressure between two sections of a machine, assuring proper drainage at all pressures. This valve is termed the heart of the modern Stickle System for paper drying.

The Stickle Visible Micro Adjustable Orifice with Indicating Thermometer (below) permits visible operation and accurate modulated temperature control on driers. Eliminates steam losses due to excessive "blowing through" into return line. Obviates guess work regarding operation and substitutes exact knowledge, obtained at a glance.

The new Stickle Automatic Tension and Thermal Control (above on installation) is proving its value by its performance in many plants. It stabilizes steam flow to paper machine, controls moisture within exceedingly close limits, eliminates cockle and drier snap-offs, reduces curling and shrinkage—all this with the least possible manual attention.

Stickle Equipment paves the way for smoother operation, higher production efficiency, and decreased production costs. The equipment shown here has improved the operating records in many mills in the U. S. and Canada. It will help you solve vexing problems that are holding down production volume and increasing production costs. Investigation entails no cost—no obligation.

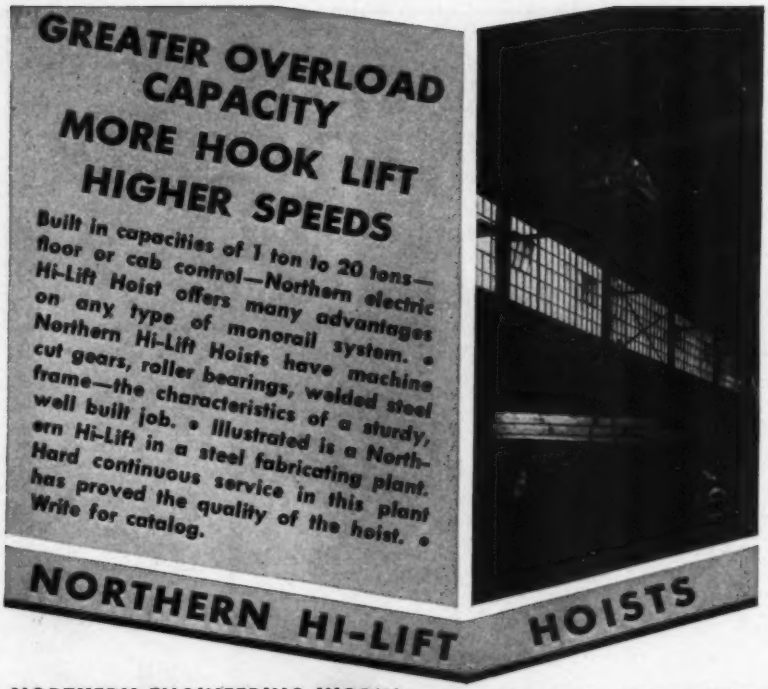


The Stickle Differential Drainage and Pumping Unit combined with Stickle Mechanical Thermo Air Eliminator prevents steam losses and contributes to operating efficiency and economy.

WRITE FOR BULLETINS 60 AND 60-C CONTAINING CHARTS ON PAPER DRYING

STICKLE STEAM SPECIALTIES CO.

2233 VALLEY AVENUE, INDIANAPOLIS, INDIANA


GREATER OVERLOAD CAPACITY
MORE HOOK LIFT
HIGHER SPEEDS
Built in capacities of 1 ton to 20 tons—floor or cab control—Northern electric Hi-Lift Hoist offers many advantages on any type of monorail system. • Northern Hi-Lift Hoists have machine cut gears, roller bearings, welded steel frame—the characteristics of a sturdy, well built job. • Illustrated is a Northern Hi-Lift in a steel fabricating plant. Hard continuous service in this plant has proved the quality of the hoist. • Write for catalog.
NORTHERN HI-LIFT HOISTS

NORTHERN ENGINEERING WORKS, 2601 Atwater St., Detroit, Mich.

CRANES *Northern* HOISTS

MICHIGAN SUPERS HAVE GRAND TIME AT SUMMER MEET

A successful outing of the Michigan Division of the American Pulp and Paper Mill Superintendents Association was held Tuesday, July 16, at the Gull Lake Country Club, Kalamazoo, with 126 men representing the various mills and allied industries of the valley present in addition to several from the Northwestern and Miami divisions.

The climax of the day's program was the presentation of a life membership in the American Pulp and Paper Mill Superintendents Association to Robert B. Stewart, veteran superintendent of the Kalamazoo Vegetable Parchment Company. The membership was presented by Lester Liberte, chairman of the Michigan Division. Ralph A. Hayward, president of KVP, spoke briefly complimenting Mr. Stewart on his record. Kent Kidder, chairman of the Kalamazoo Valley Section of TAPPI, spoke in behalf of his organization, congratulating Mr. Stewart and wishing him many more years of good health. Mr. Stewart accepted the presentation graciously, commenting that while it made him feel a bit old to realize that he had completed fifty-five years in the service of the industry, he would do it all over again if given the chance.

The golf tournament started off at 1 P. M. under the direction of the club professional, Frank Kennett. Fifty-six of the group participated in the tournament. Refreshments were served at a strategic point on the course so that during the 18 holes no one had to go thirsty for long. Dinner was served at 7:30 P. M. on the veranda of the club house. Golf winners included Barney Benson, J. T. Geraghty and Al Sherwood. Following the presentation of prizes the supers were entertained by color movies taken by W. E. Kelley of E. D. Jones Company.

◆

CONVENTIONS AND COMING EVENTS

Aug. 20-23—Technical Association of the Pulp and Paper Industry, Fall Meeting, Seattle, Washington.

Sept. 9-13—American Chemical Society, Fall Meeting, Detroit, Michigan.

Sept. 18—National Industrial Advertisers' Association, National Conference of Industrial Advertising and Marketing Executives, Detroit, Michigan.

Sept. 20-21—American Pulp and Paper Mill Superintendents Association, Northeastern and Connecticut Valley Division, Joint Meeting, Poland Springs House, Poland Springs, Maine.

Sept. 27-28—American Pulp and Paper Mill Superintendents Association, New York-Canadian Division, Lake Placid Club, Lake Placid, New York.

Oct. 2-5—Electrochemical Society, Fall Meeting, Ottawa, Canada.

Oct. 4-5—American Pulp and Paper Mill Superintendents Association, Fall Meeting, Pennsylvania-New Jersey-Delaware Division, Yorktown Hotel, York, Pennsylvania.

Oct. 7-11—National Safety Congress and Exposition, Stevens Hotel, Chicago.

Dec. 2-7—Fourteenth National Exposition of Power and Mechancial Engineering, Grand Central Palace, New York City.

April 1-4—Eleventh Packaging Exposition and Conference, Stevens Hotel, Chicago.

SAFETY

The Paper Industry Safety Contest closed June 30, and because the National Safety Council requires more time and extra work in checking the scores for the final month of the contest, the scores for June were not ready for publication in this issue.

N. I. A. A. EXPOS. SPACE SOLD OUT

All space available for the exposition in connection with the Conference of the National Industrial Advertisers Association in Detroit, September 18-20, has been reserved, according to Chairman Wilson Burden of Witte & Burden, Detroit. The conference, to be held at the Statler Hotel, is expected to bring representatives of more than 600 industrial concerns into sessions for three days devoted to problems and techniques in advertising and marketing the products which are used by other industries of the nation in their manufacturing processes. Twenty-six concerns have taken exposition space.

◆

▶▶▶ THE STEVENS HOTEL, Chicago, will be the scene of the 11th Annual Packaging Exposition and Conference April 1-4, it was announced recently by the American Management Association, sponsoring organization for the annual event. The 1941 exposition will represent the fourth Packaging Exposition held in Chicago.

50 to 1 Advantage!

RIFFLERS
HANDLING 100 TONS OF PULP AT 1% CONSISTENCY OCCUPY ABOUT 3000 [sq]

VORTRAP
TO HANDLE 100 TONS OF PULP AT 1% CONSISTENCY TAKES UP ONLY 60 [sq]

SEE what a startling change this would make in your plant layout. Consider the benefits you will gain by modernizing and streamlining the handling of your paper furnish with Vortraps—reducing to 1/50th the plant space often required for that operation.

5 OTHER IMPORTANT VORTRAP FACTS!

1—Low Initial Cost
2—Continuous Operation
3—No Moving Parts
4—Very Low Maintenance
5—Simplicity of Operation

Over 200 pulp and paper mills now using Vortraps agree that the simplicity, adaptability, and economy of Vortraps are valuable aids in producing a better product and making big savings in operating costs. Vortrap Bulletin 209 "tells all." It will pay you to write for it today.

Simple graphic comparison of the floor space required by Rifflers (black area) and Vortraps (white area) handling the same character and quantity of pulp.

NICHOLS

ENGINEERING & NERCO RESEARCH CORP.

60 WALL TOWER
NEW YORK, N. Y.

UNIVERSITY TOWER
MONTREAL, P. Q.

Soundview Sets Fast Pace in Modernizing First Mill Unit

The Stebbins Engineering Corporation of Seattle lined the six new bleach cells in advance of the shutdown period, and in five of the six days the original unit was shut down, Stebbins lined the two-machine wire pits, two-machine stock chests (both with white tile), patched the old bleach cells and the white tile lined screw conveyor troughs.

From March 1940 Pacific Pulp & Paper Industry

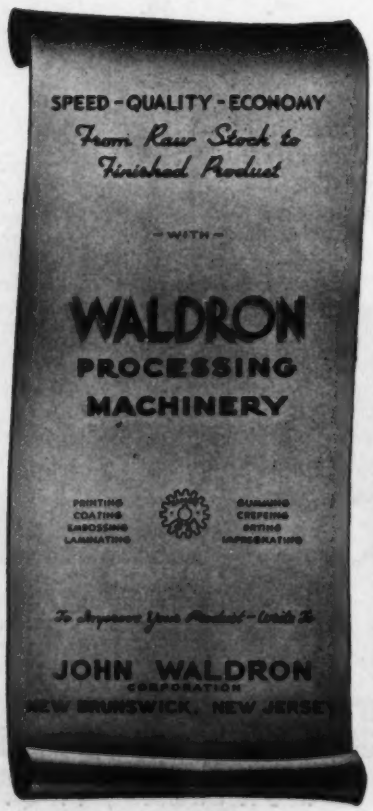
AN EXAMPLE OF STEBBINS SERVICE

Materials and men are available at strategic points to get on the job, whether for a new lining installation, a relining, or a repair.

SEMCO

Stebbins Engineering and Manufacturing Co.

Eastern Boulevard · Watertown, N. Y.



ALLIED

HILL CLUTCH— ACME MACH'Y ARE MERGED

The Hill Clutch Machine and Foundry Company, Cleveland, has purchased the assets of the Acme Machinery Company and an ensuing new corporation, The Hill Acme Company, has resulted, it was announced recently. Combined annual business of these companies exceeds $2,000,000 and working capital will exceed $1,000,000, it is said.

The Acme Machinery Company was founded in 1882 by the late Frederick W. Bruch and is, at present, operated by Karl F. Bruch, president, and Edward P. Bruch, secretary-treasurer, sons of the founder. The Acme organization will continue to operate as a division of the new Hill Acme Company as will the Cleveland Knife and Forge Company and the Canton Foundry and Machine Company, acquired by the former Hill Clutch Machine and Foundry Company within the past nine years.

The Hill Clutch Machine and Foundry Company was organized in 1886 by Harry Hill and the late Jacob B. Perkins, whose son, Ralph, is president of the board. The recently-organized Hill Acme Company manufactures upset forging machines, thread rolling and thread cutting machines, nut tapping machines, complete line of pipe coupling equipment including forgings, champfering and tapping, bolt, nut and rivet machines. The Cleveland Knife division manufactures shear blades, slitting cutters and machine knives. The Canton Shear division manufactures all-steel alligator shears, portable floor cranes and industrial turntables.

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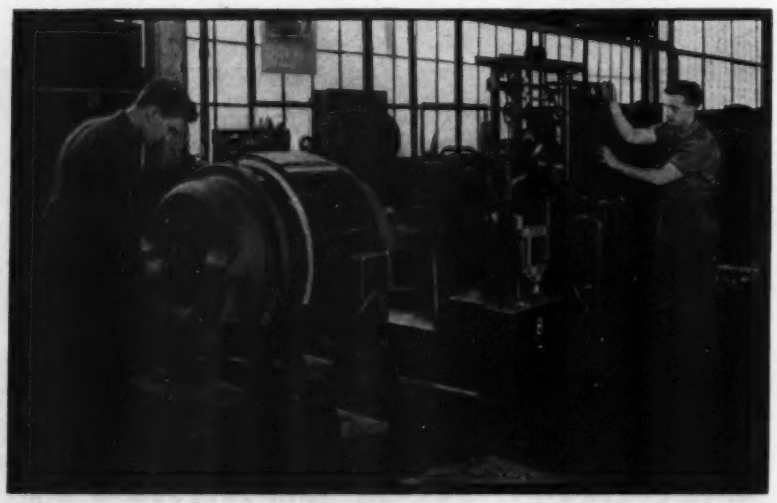
▸▸▸ THE ATLAS PLYWOOD CORPORATION, which recently acquired the property of the Advance Bag and Paper Co. at Howland, Maine, has recently placed an order for complete sawmill equipment including a complete electrically-driven Allis-Chalmers 7-foot band mill, deck machinery, edger, transfers, motors, etc.

◆

RELIANCE INSTALLS NEW DYNAMOMETER

The Reliance Electric and Engineering Company has recently installed an important addition to the testing facilities of its laboratories with the purchase of a new dynamometer, capable of testing a 400 hp. motor at 1800 r.p.m., a 300 hp. motor at 1200 r.p.m. and a 225 hp. motor at 900 r.p.m. The dynamometer combines an unusually high degree of accuracy with a minimum of necessary floor space.

The power absorption capacity is produced by a magnetic drag which is completely controlled throughout its torque range by field rheostats which vary with existing current to produce any value of torque which may be desired. The resulting losses are dissipated through water cooling of the dynamometer.



Undergoing test for normal or real efficiency is a 200 hp., 1750 r.p.m., d-c. splash-proof Reliance motor. Openings shown in lower part of motor brackets are for air intake to the motor. Air exhaust is from the lower part of the stator.

BLEACHER UMPIRES ARE OFTEN WRONG!

Near or far, anyone can guess. But the man who gives answers you can rely on is the dust-covered gent who stands right over the action.

The right answers are just as difficult in industry, as more exact manufacturing requirements add to friction's potential cost. And in the serious business of keeping down these costs, Shell men are succeeding daily by using the umpire's reliable system. They are constantly out on the job, working in your plants, getting their facts first hand.

That's why changes in design, speeds, pressures and other operating requirements of your machines don't take Shell men by surprise. They have seen those changes coming, months, sometimes years, before they arrived. And backed by the skill and resources of Shell research, they bring to new machines and old machines alike . . . in a wide variety of industries . . . lubricants that keep down costs from the day they go into service.

It's this "action-on-the-spot" method of getting the facts that pays off—and you are the one it pays. Have you had your Shell man's recommendation for your machines?

SHELL

SHELL INDUSTRIAL LUBRICANTS

NAMES *in the* NEWS

Personals

GUY O. BABCOCK NAMED NEPCO'S VICE PRESIDENT

Guy O. Babcock, president of the Wood County National Bank of Wisconsin Rapids, Wisconsin, was named vice president of the Nekoosa-Edwards Paper Company by the board of directors following the annual stockholders' meeting on July 17.

Guy O. Babcock

Mr. Babcock succeeds Jos. A. Auchter, former vice president and treasurer, who resigned July 15. The directors, all of whom were re-elected at the stockholders' meeting, named C. A. Jasperson secretary-treasurer.

John E. Alexander continues as president and general manager, and Harry Deyo was named assistant secretary.

Directors of the Nekoosa-Edwards Paper Company are: L. M. Hanks, Madison, Wisconsin; A. S. Puelicker, Milwaukee, Wisconsin; Judson G. Rosebush, Appleton, Wisconsin; Mr. Babcock, Mr. Jasperson, Mr. Alexander, and J. B. Nash, Wisconsin Rapids, Wisconsin.

Mr. Alexander announced that the election of Mr. Babcock to the vice presidency would not alter Mr. Babcock's active affiliation with the Wood County National Bank, of which he is president.

▶▶▶ *Walter B. Morehouse,* formerly connected with the technical sales department of Bennett, Incorporated, is now sales manager of the paper division of National Oil Products Company, Harrison, New Jersey. Mr. Morehouse is a graduate of the New York State College of Forestry where he majored in subjects pertinent to the pulp and paper industry.

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▶▶▶ Announcement has been made by The Duriron Company, Inc., Dayton, Ohio, that *Delbert E. Jack* has been made general sales manager. He succeeds W. H. Scott, who is retiring.

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▶▶▶ *William Bond Wheelwright,* well known in pulp and paper-making circles, is to become associated with The Callaway Associates, advertising counsellors, Boston. Mr. Wheelwright will take over his new duties in the early part of September.

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APPOINTMENTS AT UNION BAG CORP.

Several appointments have been made at the Savannah (Georgia) plant of the Union Bag and Paper Corporation.

F. W. Kelly, assistant office manager, has been made assistant general superintendent; B. W. Martin is now chief chemist, succeeding O. W. A. Rodowski; Robert Ervin, Jr., formerly associated with the company, has returned as plant engineer, succeeding B. E. Prevost, and H. R. Arnold is now power plant superintendent. Mr. Ervin has been connected with the Jeffrey Manufacturing Company, while Mr. Arnold comes to Union Bag from the Florida Power and Light Corp.

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FALK ELECTS CARPENTER EXEC. VICE PRESIDENT

Announcement from the Falk Corporation, Milwaukee, Wisconsin states that M. A. Carpenter has been elected executive vice president and a director. Mr. Carpenter has been associated with the Falk Corporation for the past 16 years having served in various offices during that time. His last position before the new appointment was that of secretary and director of sales.

Necrology

GEORGE WEST GAIR

Son of the founder of Robert Gair Company, Inc., and chairman of the board of that company, George West Gair passed away July 21, 1940, at his home at Greens Farms, Connecticut.

Mr. Gair began his career with the company in 1886 and attained a thorough knowledge of the executive, manufacturing and selling technique by his

George West Gair

interest in all departments of the business. Since the death of his father in 1927, Mr. Gair has been chairman of the board.

Surviving Mr. Gair are his widow, a son and four sisters.

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▶▶▶ *Norman N. Fowler,* president of the Hampden Glazed Paper Company, Holyoke, Massachusetts, passed away July 30 at the age of 83. He is survived by his widow and three children.

◆

▶▶▶ President of the Missisquoi Corporation, St. Albans, Massachusetts, since 1924, *Herbert E. Raymond,* passed away July 23 at the age of 59. Mr. Raymond, a graduate of the Massachusetts Institute of Technology, joined the Missisquoi Corporation in 1912. He is survived by his widow, two sons and two daughters.

▶▶▶ *Edward B. Murray,* former vice president of the Union Bag and Paper Corporation, passed away suddenly at Mount Vernon, N. Y., at the age of 71. For the last ten years he has been president of various companies.

◆

▶▶▶ *Clarence Hurdage,* superintendent of the Central Fiber Products Company paper mill at Mount Carmel, Illinois, passed away July 29. He was 55 years of age.

◆

▶▶▶ As this issue goes to press, news is published of the passing of *William P. McCorkindale,* South Hadley, Massachusetts. Mr. McCorkindale had invented a machine to make paper by a new method, one which eliminated the necessity for continuous wires and heavy press rolls. He was 51 years of age.

◆

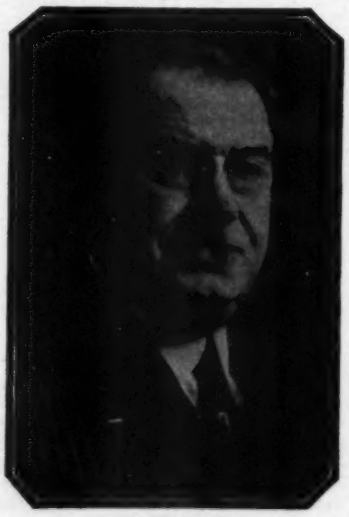
▶▶▶ *Howard G. Hayes,* superintendent of Ashland Paper Mills, Ashland, New Hampshire, passed away suddenly July 1. He was 59 years of age.

◆

FRED C. GARDNER

Associated with E. C. Atkins and Company, Indianapolis, for the past 59 years, Fred C. Gardner, secretary-treasurer of the company, passed away July 28 after a month's illness.

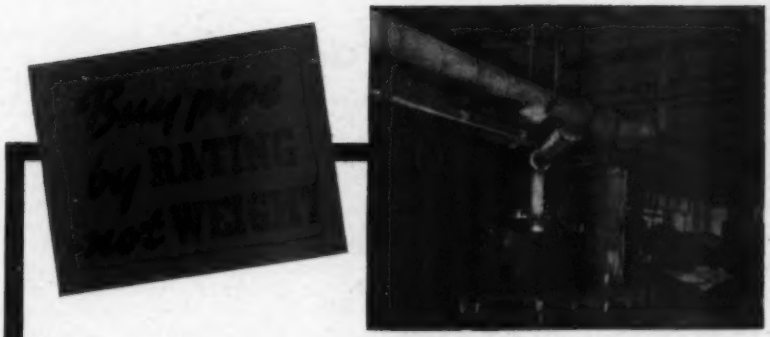
Mr. Gardner was born in 1862 and came to Indianapolis when 17 years



Fred C. Gardner

of age. He began his career with E. C. Atkins and Company in 1881 and became secretary-treasurer in 1900. He had been associated with the company longer than any other member of its personnel.

Surviving Mr. Gardner are his widow, two daughters and a sister.



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Convention Papers . . . Abridged

Systematic Color Designations For Paper

DEANE B. JUDD, Physicist
National Bureau of Standards

As a result of co-operative activity extending over a period of years, there has recently appeared the description of a method of designating colors [Dean B. Judd and Kenneth L. Kelly, Method of Designating Colors, J. Research NBS 23,355 (1939); RP 1239]. Three organizations cooperated in its development: the American Pharmaceutical Association, the Inter-Society Color Council, and the National Bureau of Standards; it is known as the ISCC-NBS method of designating colors. This method is intended to fulfill the requirements laid down in 1931 by Dr. E. N. Gathercoal, chairman of the Inter-Society Color Council; that is, the method is intended to provide designations "sufficiently standardized as to be appreciated and usable by science, art, and industry, and sufficiently commonplace to be understood at least in a general way, by the whole public."

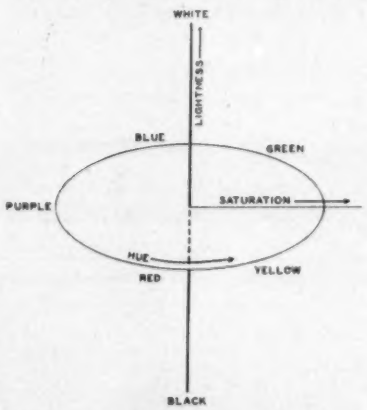

Fig. 1—Dimensions of the surface-color solid.

The chairman of your Optical Properties Committee, Dr. J. L. Parsons, has asked me to describe to you this method of designating colors, particularly in connection with its applicability to the colors of paper.

The designation for all but very grayish colors consists of a hue name *(red, green, blue, purple,* and so on) preceded by appropriate modifiers (such as *weak, moderate, strong, light medium,* and *dark.*) The designation for very grayish colors consists of a noun *(white, gray* or *black)* with modifiers appropriate to the lightness and hue of the colors (such as *dark reddish gray* or *yellowish white*).

The relationships between the names can best be understood by a consideration of the psychological color solid. The dimensions of this solid are hue, lightness, and saturation. (see Figure 1*). Since the color of any matte opaque surface in daylight is saturation (see Figure 1*). Since the color called the surface-color solid. Lightness starts at zero for black, represented at the bottom of the figure, and is measured by distance from the base plane, being a maximum for white represented at the top of the figure. Hue is represented by angle about the black-white axis, giving the closed series: *red, yellow, green, blue, purple, red,* with their intermediates. Saturation is represented by distance from the black-white axis, being zero for black, white and the intermediate grays, and increasing toward the boundary of the surface-color solid on which would be represented the most vivid color producible from reflecting surfaces viewed in daylight.

Colors of one hue are therefore represented in the solid by points falling in a single one of the vertical planes extending outward from the black-white axis. Colors of one lightness are represented by points in any one horizontal plane; and colors of one saturation are represented by points in any one of the series of right circular cylinders concentric about the black-white axis.

The hue name of the color designation is intended to indicate a range of hue angle in the color solid, and other words in the designation are to indicate ranges of lightness and saturation for this hue range. The basic hue names are *red, orange, brown, yellow, olive, green, blue, purple,* and *pink.* The accompanying table gives the complete list of hue names including the compounds. Figure 2* gives the system of modifiers. Deviations from the moderate range in lightness are indicated by the terms, *light* and *dark;* deviations in saturation by the terms, *weak, strong,* and *vivid;* and deviations in both lightness and saturation, by the terms, *pale, deep, dusky,* and *brilliant.* The whole color designation, hue name and modifiers, therefore defines a block of the surface-color solid bounded by vertical planes of constant hue, horizontal planes of constant lightness, and cylindrical surfaces of constant saturation. There are a few more than 300 such blocks for black, grays, and white. Figure 3* shows a sketch of the blocks for colors of one hue, purple. Every possible color is represented in one or another of such blocks; therefore this system gives a designation for every color. The

Hue names of the ISCC-NBS method of designating colors

Hue names applying to dark colors only	Hue names applying chiefly to colors of medium lightness	Hue names applying to light colors only	Hue names applying to colors of all lightnesses
	Red purple	Purplish pink	
	Purplish red		Yellowish green
	Red	Pink	Green
Reddish brown	Reddish orange		Bluish green
Brown	Orange	Orange pink	Blue green
Yellowish Brown	Yellowish orange		Greenish blue
Olive brown	Yellow		Blue
Olive	Greenish yellow		Purplish blue
Olive green	Yellow green		Bluish purple
			Purple
			Reddish purple

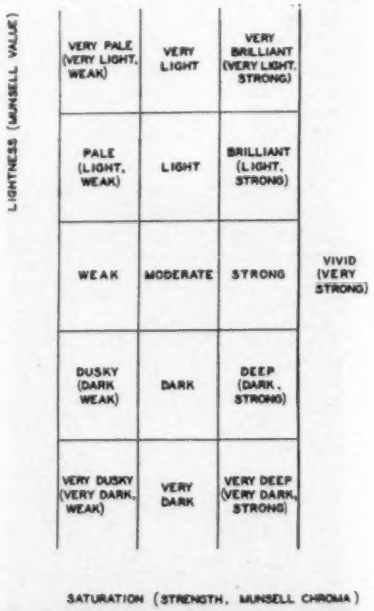

Fig. 2—System of modifiers. The ISCC-NBS color designation, except for very grayish colors, consists of one of the hue names listed in table combined with one of these modifiers.

Abridgments of papers presented at the annual meeting of the Technical Association of the Pulp and Paper Industry, held in New York City, February 19-22, 1940 appeared in the March, April, May and June issues. Another installment of these abridgments is given this month.

(*) Figures 1 and 2 were taken from National Bureau of Standards Research Paper RP1239; Figure 3 is from *J. Am. Pharmaceutical Ass'n, 27,* 208 (1938).

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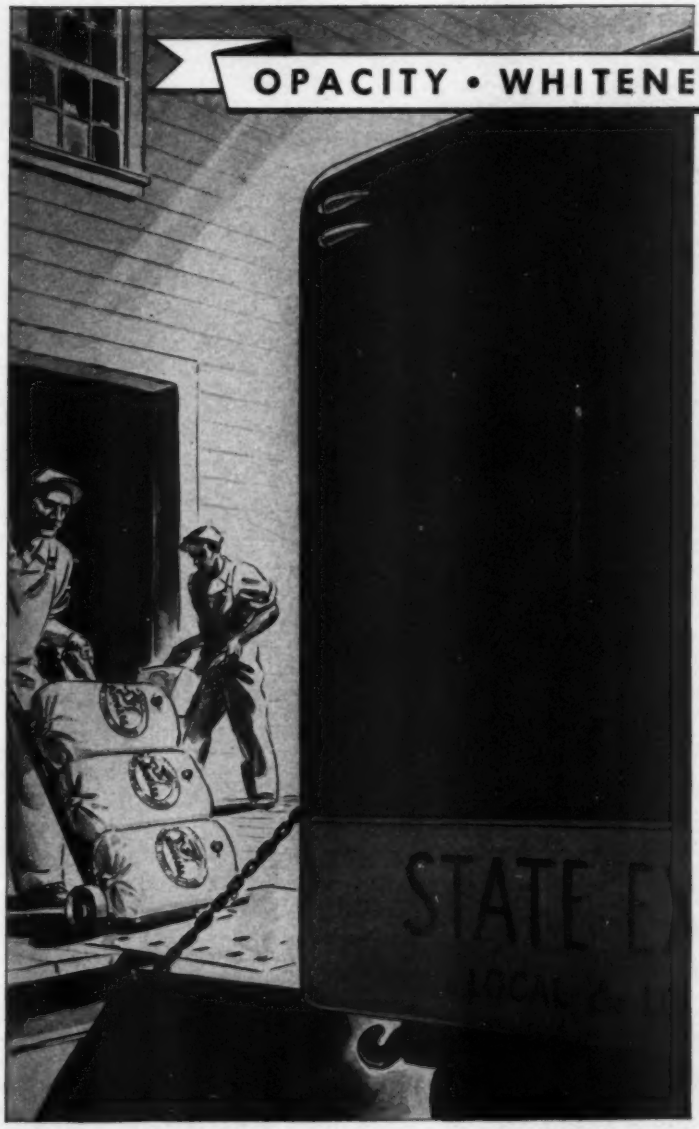

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complete set of designations involves 12 color names and 12 modifiers, making but 24 basic terms.

The way to find the ISCC-NBS designation is first to obtain the Munsell equivalent of it by comparison with the standards in the *Munsell Book of Color* [*Munsell Book of Color*, standard and abridged editions (Hoffman Bros., Baltimore, Md., 1929). Now available only through the Munsell Color Co., 10 East Franklin Street, Baltimore, Md.], then read the ISCC-NBS color designation directly from the name charts given in NBS Research Paper, RP-1239 (See previous reference). Figure 4

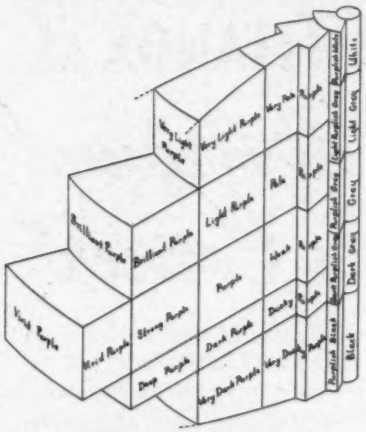

Fig. 3—Sketch of the blocks forming a portion of the surface-color solid including purples, grays, black and white.

shows the form of one of the simpler of these name charts; in this chart, which applies to the Munsell hue range 3P to 7P, the colors all have the hue name, purple, suggested by the Munsell system. Munsell hue name has, however, not always been followed; for some Munsell hue ranges several hue names (such as orange pink, orange, and brown) have been adopted to accord with common usage (instead of the single Munsell hue name, yellow-red).

The ISCC-NBS method of designating colors has been approved for the colors of drugs and chemicals by the voting delegates to the Inter-Society Color Council from a number of national associations of which your association is one. The Council has recommended this method tentatively for general use. As rapidly as particular valid uses are discovered, other than for the colors of drugs and chemicals, it is planned to extend the recommendation to such uses. The question whether the Council should recommend this method for paper colors will undoubtedly be put to your delegates in the near future.

In 1936 the Grading Committee of the Groundwood Paper Manufacturers Association issued a Standard Color Nomenclature System and Manual, known briefly as the *Blue-Book*. The *Blue-Book* contains samples of about 200 colors which are identified by names chosen from traditional paper trade nomenclature, from dyestuff names, and from such other sources as the Textile Color Cards (Issued by the Textile Color Card Association of the United States, Inc., 200 Madison Avenue, New York, N. Y.) and the *Dictionary of Color* [A. Maerz and M. Rea Paul, *A Dictionary of Color* (McGraw-Hill, New York, 1930)]. The purpose of the *Blue-Book* is primarily to provide for adequate means of color description for

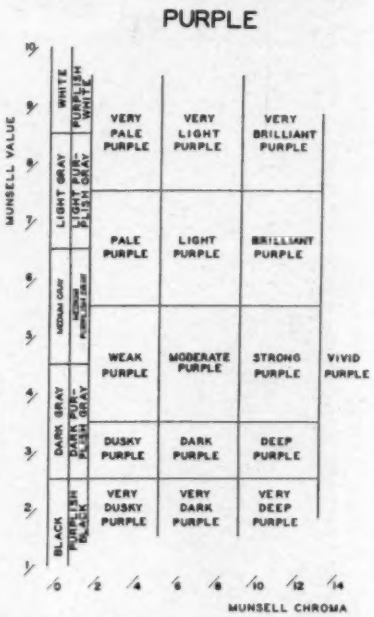

Fig. 4—Name chart for purple colors. This chart applies to the Munsell hue range 3P to 7P. It shows how the ISCC-NBS color designation of a sample may be found from its Munsell notation.

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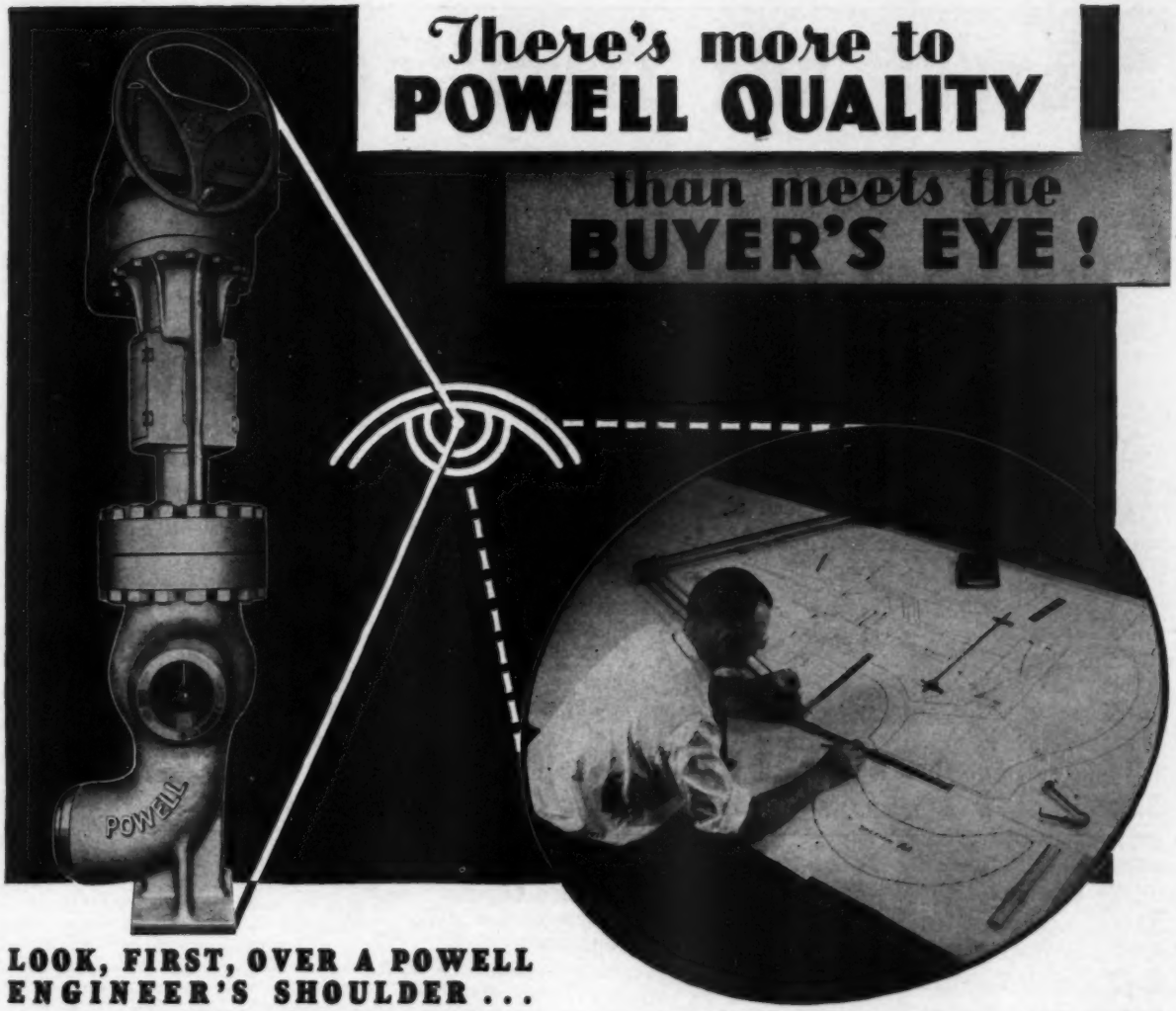

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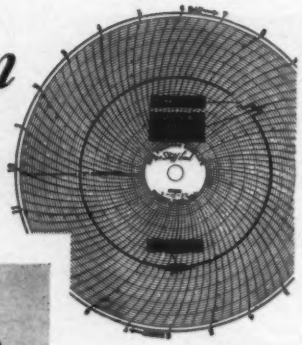

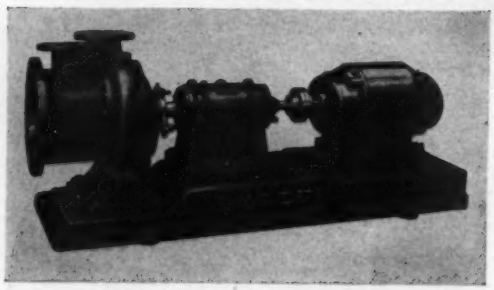

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trade practices. It is necessary that trade practices restrict the depth of dyeing to an amount consistent with the increased cost over white papers. The *Blue-Book* shows clearly the relation between color and cost of groundwood paper. The ISCC-NBS color designations cannot, of course, show the relation between the cost and color of groundwood paper so well as the *Blue-Book* which was constructed primarily for that very purpose. However, the various uses to which the *Blue-Book* has been put suggest the need for standardized color designation in the paper industry as a whole.

This discussion serves to raise the question whether it would be advantageous to the paper industry to study particular uses for which the ISCC-NBS method of designating colors is adapted. One first step in such a study might be a survey of the colors indicated by traditional paper-color names. Another step might be to complete the translation of the color of the *Blue-Book* Manual into terms of the ISCC-NBS system of color designation. The discovery of particular uses in the paper industry to which this system of color designations is adapted must necessarily be by those acquainted with the industry, preferably by a group of experts representing the various phases of the industry. The members of your delegation to the Inter-Society Color Council will probably take the lead in such a study because they will doubtless be asked to advise the Council what recommendation should be made concerning applicability of the ISCC-NBS color designations to paper.

The Economic Disposal of Waste Sulphite Liquor

G. H. TOMLINSON[1] and
L. S. WILCOXSON[2]

That calcium bisulphite liquors can be evaporated and can be burned satisfactorily has been very definitely proven by large scale experiments we have conducted. On one occasion 80,000 lb. of calcium bisulphite waste liquor concentrated to 50 per cent solids was burned at the rate of 8,000 lb. per hour over a continuous run of 10 hours in a B&W-Tomlinson Black Liquor Recovery Unit with satisfactory practical results.

An analysis of the possibilities of such a process proved conclusively that the liquor can be disposed of satisfactorily and stream pollution from this source eliminated entirely. Operating difficulties which, while by no means unsurmountable, were nevertheless present, as well as the desire for greater economic returns, led to a further search for a satisfactory solution along analogous lines, and the writers undertook the investigation of the use of other bases for the cooking liquor.

A series of circumstances resulted in particular attention being given to magnesium as a suitable cooking liquor base. It was found, on investigating magnesium, that of all of the chemicals which might be considered, it was the only one in which a sulphide was not produced upon reduction from a sulphate, but instead had the peculiar property of being reduced from a sulphate to an oxide with the liberation of SO_2, and that furthermore an oxide could be produced under certain specific conditions that was exceedingly reactive in so far as the production of magnesium monosulphite and bisulphite were concerned. This suggested a satisfactory basis for a cyclic process involving the recovery of chemical in addition to the recovery of waste heat. Following extensive laboratory investigation it was decided that the results were sufficiently promising to justify the installation of a semi-commercial pilot plant as a necessary intermediate step before undertaking the installation of a full scale commercial plant.

The pilot plant was installed and operated at the Cornwall, Ontario, mill of Howard Smith Paper Mills, Ltd., during 1937. The installation was arranged so that one of the existing 10 ton digesters at the plant could be operated with magnesium base liquor for one or a number of cooks, depending upon requirements of the pilot plant, and so that upon completion of any test period operation could be immediately resumed with calcium base liquor in accordance with standard conditions.

A diagrammatic flow sheet illustrating the equipment involved, and also indicating the quantities of materials handled for one cook is shown in Figure 1.

Throughout the testing of the pilot plant the following operations were involved:

1) Preparation of magnesia base cooking acid essentially free from impurities.
2) Preparation of pulp from magnesia base acid.

(1) Technical director, Howard Smith Paper Mills, Ltd.; (2) Executive Assistant, The Babcock & Wilcox Company.

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3) Reclamation of the residual liquor from the pulping process.
4) Neutralization of the residual liquor.
5) Concentration of neutralized residual liquor.
6) Burning of concentrated residual liquor.
7) Recovery of magnesia.
8) Recovery of sulphur.

It was concluded that the composition of magnesia base cooking acids could be readily controlled to meet the varying demands of the industry; that magnesia base cooking produced a pulp commercially not less satisfactory, and in all probability superior to calcium pulp; that the neutralization of the acid residual liquor presented no difficulties; that, if the liquor had a pure magnesia base, no serious scale formation would occur, and that with satisfactory neutralization plain steel could be used in the construction of the evaporators; that the concentrated residual liquor can be burned satisfactorily for maximum recovery of chemicals in the form of magnesia (MgO) and sulphur dioxide (SO_2), and that the resulting gases of combustion can be utilized for steam generation at any pressures that might be economically desirable with high efficiency in view of the dry condition of the ash, that the major portion of the magnesia ash can be satisfactorily removed from the gases by separators of the cyclone type; and that, with equipment of suitable design, adequate sulphur recovery could be made and the recovered sulphur could be used in making cooking acid without further processing.

It is perhaps appropriate to discuss briefly the application of the data obtained to a full scale commercial plant, having in mind that all conditions, whether relating to equipment, operations involved or predicted results, are predicated solely upon the results obtained in the operation of the pilot plant.

Figure 2 shows a flow diagram of the magnesium bisulphite system—the full lines indicating new equipment and process involved over and above existing equipment and process that will be found in any sulphite mill operating on calcium bisulphite cooking liquor at the present time,—this existing equipment and process being indicated by dotted lines.

Figure 3 is the same as far as layout is concerned as Figure 2, but is in the form of a material balance, having shown thereon specific quantities of materials calculated on the basis of production of 100 tons of pulp, —or in other words the daily quantities involved in a plant having a production of 100 tons of pulp per day.

In making these calculations applicable to average sulphite mill conditions certain assumptions necessarily had to be made, and it was considered logical to use for these assumptions conditions which were found to exist in the main and pilot plants at Cornwall, Ontario, during the period of pilot plant operation.

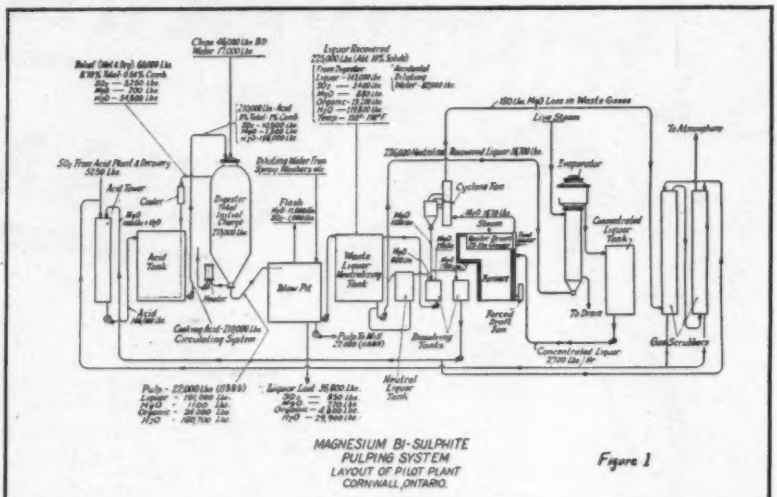
Total daily chemical makeups to such a 100-ton plant are:

Magnesium oxide	0.23 ton
Sulphur	2.53 tons

or, on the basis of a ton of pulp produced:

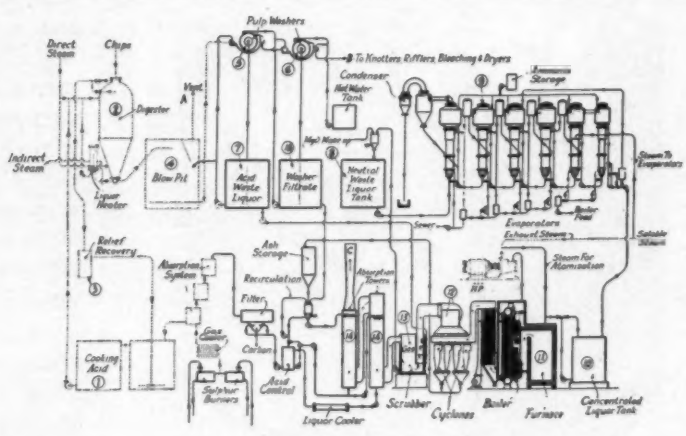
Magnesium oxide (approximately)	5 lb. per ton
Sulphur (approximately)	50 lb. per ton

The steam produced is, naturally, a variable quantity, depending upon the degree of concentration accomplished in the multiple effect evaporators and the amount of heat absorbing surface installed in the boiler unit. An average condition has been assumed in this material balance which indicates a steam production of approximately 12,800 lb, per ton of pulp produced, calculated from and at 212 deg. Fahr. The actual pressure and temperature at which the steam is generated is, of course, determinable by the economic requirements of any specific installation. In the event high



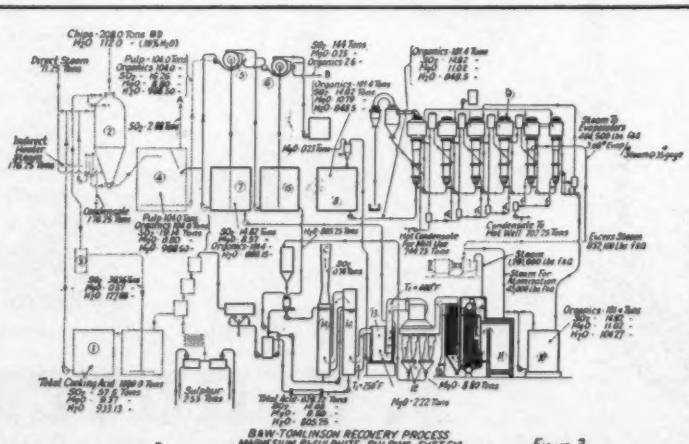
MAGNESIUM BI-SULPHITE PULPING SYSTEM
LAYOUT OF PILOT PLANT
CORNWALL, ONTARIO.

Figure 1



B&W-TOMLINSON RECOVERY PROCESS
MAGNESIUM BI-SULPHITE PULPING SYSTEM
FLOW DIAGRAM - 100 TON PULP MILL

Figure 2



B&W-TOMLINSON RECOVERY PROCESS
MAGNESIUM BI-SULPHITE PULPING SYSTEM
FLOW DIAGRAM - 100 TON PULP MILL

Figure 3

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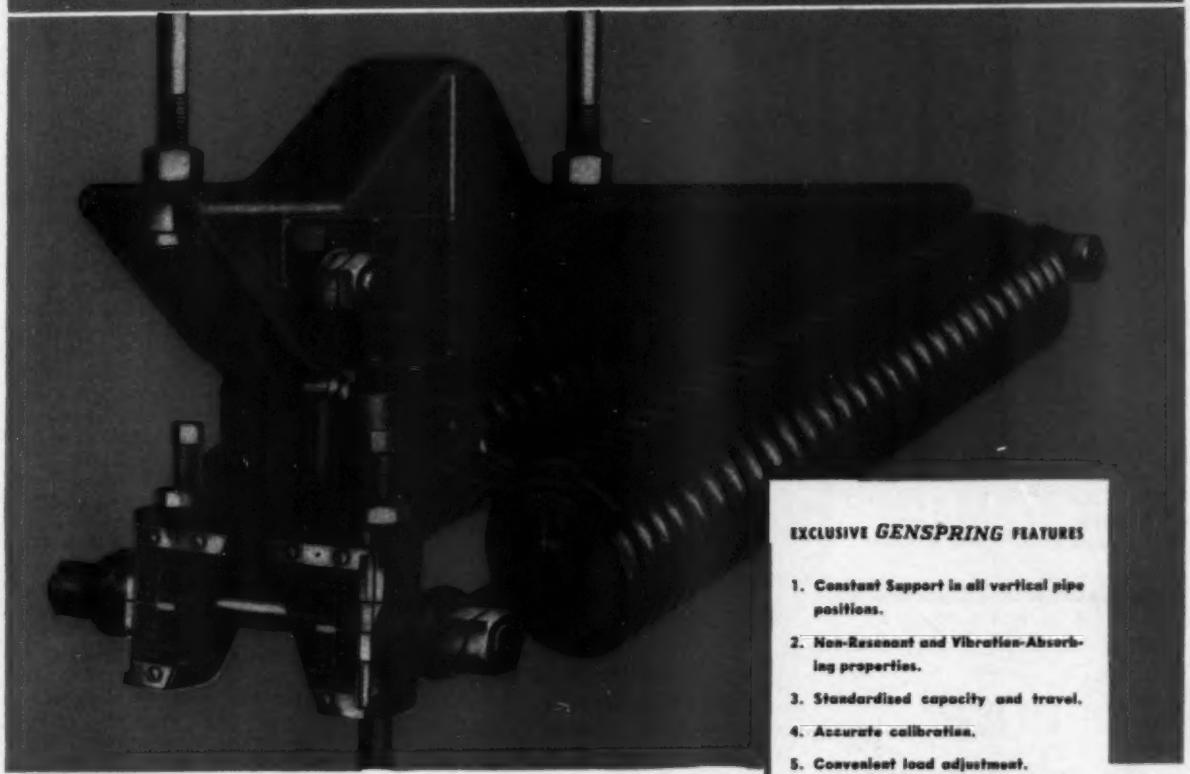

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Unique GENSPRING Constant-Support Hangers eliminate weight-stress . . . boost overall safety factors of piping!

Through use of Grinnell GENSPRING Hangers, the weight of the pipe is accurately balanced at all times . . . weight-stress due to thermal movement is practically eliminated . . . and vibration is minimized. For, these unique hangers are precision-engineered to provide constant support and non-resonant vertical movement in all "hot" and "cold" positions of the pipe. They are made to support loads from 250 to 8500 pounds.

No other hanger offers such opportunities for improvements and economies in power piping systems! That's why GENSPRING Constant-Support Hangers are now serving in leading steam plants, in naval and commercial ships, and in major oil refineries throughout the world, after only 3½ years on the market.

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pressure and high temperature steam is generated and utilized in a turbine generator, steam for the evaporators amounting to approximately 4,050 lb. steam and for atomization of liquor in the furnace amounting to approximately 450 lb. steam—both on the basis of from and at 212 deg. Fahr., and per ton of pulp produced, can be supplied at pressures around 35 lb. per sq. in. either from the exhaust of a back pressure turbine utilizing the steam generated, or if a condensing turbine is employed by bleed, or from existing steam headers in the main plant. However this is accomplished, the net amount of steam in excess of evaporator and atomization requirements is approximately 8,320 lb. from and at 212 deg. Fahr. per ton of pulp produced. The amount of power generated will naturally vary dependent upon the particular conditions employed.

The power required for a 100-ton plant as described for pump and fan motors and the like amounts to approximately 450 hp.

The labor requirements for the plant can be adequately handled by 5 men per shift as follows:

1 Operator for washers
1 Operator for evaporators
1 Operator for boiler unit
1 Control man
1 Repair man

As far as maintenance is concerned, there is nothing in the equipment involved in this Recovery Plant that should necessitate more than normal attention.

In conclusion, this development work indicates very clearly that the pollution problem can be entirely eliminated by a process that is inherently economical.

The Evaluation of Strength Characteristics of Corrugated Boxes

D. M. HAWLEY, Director of Research
Stein, Hall Manufacturing Co.

In order to correctly evaluate the merit of a corrugated box as a shipping container serious consideration must be given as to just what constitutes its effective strength.

It is not unusual for corrugated shipping containers to encounter humidity conditions of from 30 per cent to 90 per cent relative humidity during shipment and storage. Therefore, a container must be capable of protecting its contents throughout this range of humidity conditions.

A box which gives a superior degree of protection to its contents under adverse conditions will have a more than adequate factor of safety under more ideal conditions. Therefore, in order to determine the true value of a corrugated shipping container, the testing of its various essential strength characteristics should be done under such conditions of temperature and relative humidity as are most adverse to the particular strength characteristic being tested.

It is a well-known fact that such requisite strength characteristics of corrugated boxes as are determined by the compression test, and the revolving drum test, do not run hand in hand throughout the range of relative humidity conditions commonly encountered by corrugated shipping containers.

The old axiom to the effect that a chain is no stronger than its weakest link may logically be applied to shipping containers. The effective resistance of a corrugated box to compression loads is that which it shows under relative humidity conditions of around 85 per cent to 90 per cent rather than that shown at the usual testing conditions of 40 per cent to 65 per cent. Likewise, if the true value of the box from the standpoint of resistance to shock load and rough handling is to be determined, the revolving drum test should be made under relative humidity conditions of around 30 per cent to 35 per cent.

A further consideration in evaluating the merits of corrugated shipping containers is the degree to which the desirable characteristic of rigidity is balanced with the just as essential characteristic of resistance to rupture under conditions of rough handling or shock load. A shipping container should have the qualities of rigidity without brittleness and toughness without limpness.

It is a matter of debate as to whether the quality of rigidity or the quality of toughness is of the greatest degree of importance in a corrugated shipping container. Unquestionably, however, both of these qualities are essential and the most satisfactory shipping container is one that has both of these qualities to the most effective degree. We know how the strength characteristics of corrugated boxes vary with changes in humidity; it is obvious, therefore, that if a box is to be considered as well balanced from the standpoint of rigidity as well as toughness it should show an ample factor of safety under the compression test at high humidities as well as showing ample resistance to rupture in the revolving drum test under low humidity.

A corrugated box, for example, that shows a high compression strength under relative humidity conditions of 40 per cent to 50 per cent but which does not have an ample degree of compression strength at high humidities or ample resistance to rupture under low humidity conditions is not a well balanced box from the standpoint of effective strength. It is essentially a fair weather box and as such can only be depended on to protect its contents under fair weather conditions. On the other hand, a box which has an adequate factor of strength to protect its contents under adverse humidity conditions will effectively protect its contents under all conditions.

Radiant Heat Drying of Paper Board

R. W. K. ULM
Container Corporation of America

For quite some time certain industries have been utilizing radiant heat in their drying operations with excellent results, a notable example of which is the Ford Motor Company's use of heat lamps for lacquer drying.

In many paper mills wet ends are capable of more production but dryer capacity is insufficient. Therefore, the idea was conceived that perhaps the use of heat lamps might be the means of increasing dryer capacity without costly mechanical changes. Accordingly, to determine the value of this idea, the preliminary experiments herein described were carried out.

Gold Reflector lamps such as are used

TIMKEN
TIMKEN
TIMKEN

by the Ford Motor Company and the newer heat lamps built with internal reflectors were both available, but the latter type was chosen because they yielded a greater concentration and a more uniform distribution of heat.

An apparatus was designed to determine the rate of drying under controlled condition of illumination and ventilation. The illumination from each side consisted of four 250-watt heat lamps mounted in the form of a square on a movable panel on 5½ in. centers. The sheet was suspended vertically from a balance in a chimney made of corrugated board which screened off stray air currents. On each side of the chimney were 12 in. x 12 in. openings for the illumination. Directly underneath the sheet position was the nozzle of an air duct which was used to give ventilation to the sheet parallel to the sheet surface in certain experiments.

For an experimental run the specimen sheet (6 in. x 6 in.) was dried in an oven, weighed, then soaked for an hour in water. When removed from soaking vessel the excess surface water was removed by blotting and the sheet suspended in the apparatus with its center on the center line of the illuminating panels so that it received practically one-fourth of the total illumination and the run commenced. The usual procedure was to measure time from the start of the illumination for the loss of water in one gram steps for the first six grams and thereafter in two gram steps until the end of the run. The sheets were never carried to the bone dry condition because before this condition could be reached the surface of the sheet would become excessively hot and start smoking.

Experiments were carried out to determine the effect of distance of the lamps, the effect of ventilation on sheet temperature, the effect of ventilation on the rate of drying, and the effect of air quality on the rate of drying.

The first experiments were concerned with the effect of the distance from the lamps to the sample on the rate of drying. The results show that the closer the lamps, the faster the drying.

All subsequent experiments of this series were carried out with the lamps at 4 inches from the sample.

The fact that distance has an effect upon the rate of drying indicates that the lamps were not radiating as large a percentage of parallel heat waves as desired. Reflectors designed to give more parallel illumination are now available and further experiments of this nature are contemplated.

A practical evaluation of the results shows that the radiant heat method is quite inefficient when compared to the usual method of paper drying. On the paper machine approximately 2.5 lb. of steam or 2500 B.t.u. are required to dry a pound of paper. The infrared drying requires 167 B.t.u. per ¼ sq. ft. or 4800 B.t.u. per pound. It is expected that practical installations might show considerably better efficiencies for radiant heat drying. Relative local costs of steam and electricity would then determine the economic feasibility of such an installation.

Wood as an Industrial Raw Material

ROBERT M. BOEHM, Director of Research
Masonite Corporation

Wood consists essentially of cellulose, lignin, hemicelluloses and extractives. The extractives include wood sugars, tannins, rosin and many other materials and for the purposes of the present discussion may be neglected.

If the wood is freed of extractives, about 20 per cent of the balance consists of hemicelluloses. These materials are the anhydrides of the wood sugars and are grouped as pentosans and hexosans. On hydrolysis the pentosans are converted to xylose and arabinose, and the hexosans to glucose, mannose and galactose. In general, hardwoods are higher in pentosans and softwoods are higher in hexosans, but both are present in all cases.

Cellulose is the major constituent of the woody material; it is about 50 per cent.

The balance of the woody material may be called the lignins. The removal of the lignin by converting it to compounds which are soluble or dispersed in water occupies practically all of the attention of the manufacturer of paper pulp. The resultant cellulose in its commercially pure condition represents about one-half of the starting wood substance and the portions which are removed are in general run to waste, as in the acid digestion processes, or burned as in the alkaline processes.

The normal Masonite process differs from the paper-making operation in that the lig-

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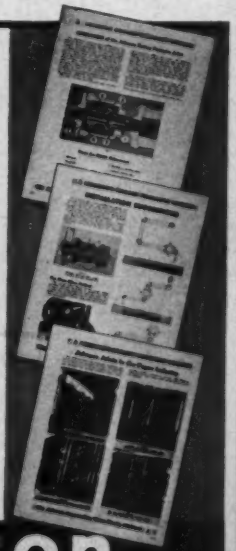

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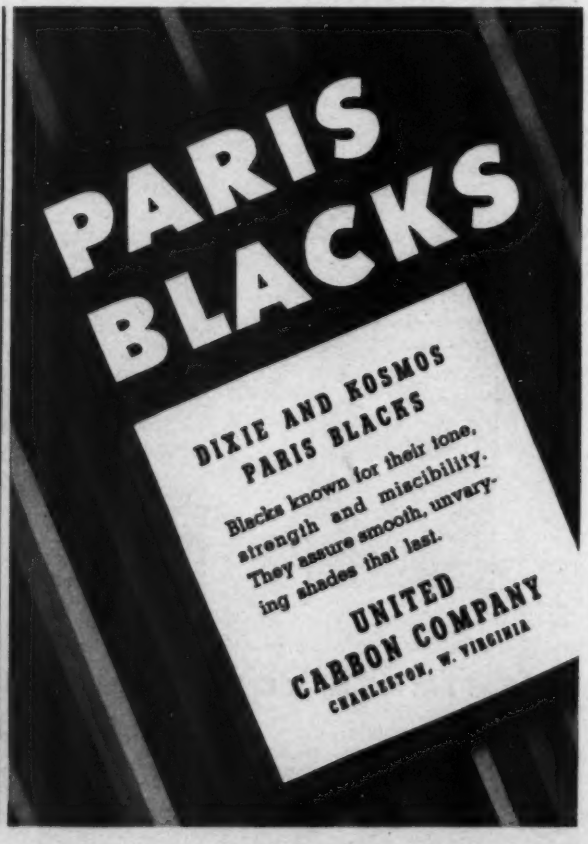
Rotary PRESSURE JOINT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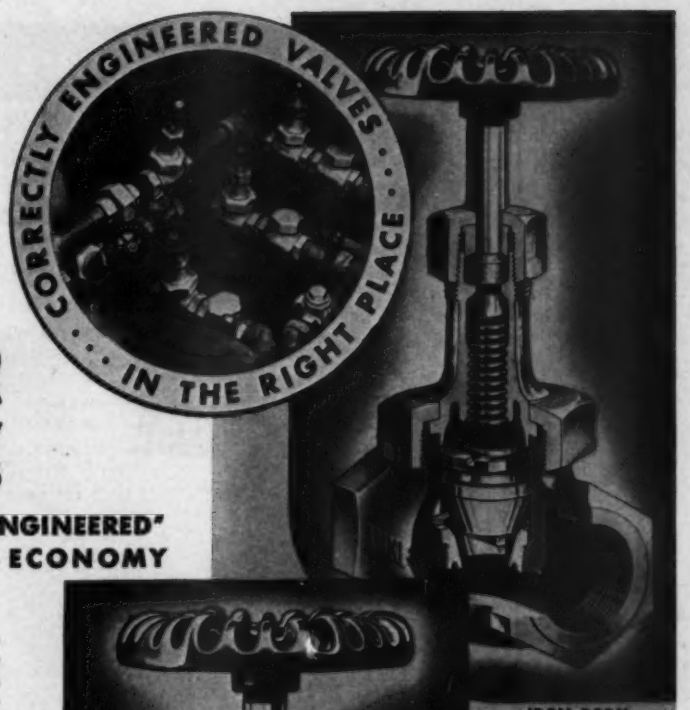


ARE "CORRECTLY ENGINEERED" FOR MAXIMUM ECONOMY ON THE JOB!

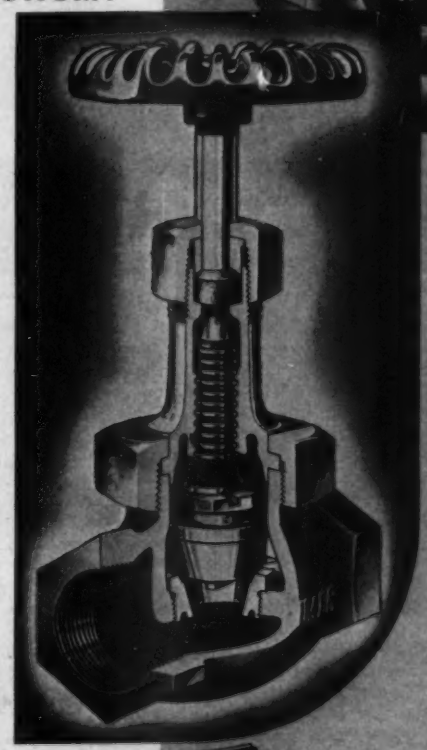
The premium in price which a buyer is willing to pay for the added convenience of an "all purpose" type of product is not always justified. In the case of valves, there is no need to sacrifice strict economy for the sake of convenience . . . nor is it necessary to jeopardize ultimate serviceability where a so-called "all-purpose" valve isn't actually "up" to the requirements of certain installations.

Lunkenheimer, in its line of "Ferrenewo" and "Renewo" valves, first of all offers the buyer a range of pressures to provide the most *efficient* valve for every job. In addition, you have the choice of either regular or plug type seats and discs, depending upon the particular service condition . . . a feature that literally *doubles* the breadth of this line and further assures an absolutely rock-bottom cost for every application.

But this wider choice of patterns by no means complicates the use of Lunkenheimer "Ferrenewo" and "Renewo" valves. The fact that parts other than seats and discs are *also* interchangeable means that fewer parts need to be kept on hand, repairs are facilitated, and ordering and handling are simplified. Here, indeed, is an example of engineered superiority worthy of your immediate investigation.

SEEING IS BELIEVING!

One of the best ways to convince yourself that "Ferrenewo" and "Renewo" valves offer you a decided advantage, both in cost and long term satisfaction, is to ask our distributor to compare them part-for-part with any valve of similar type which you may be using. It will be a revelation that you can actually *see* so much difference with the naked eye!



IRON BODY "FERRENEWO"
FIG. 1021-P
150 lb. S.P.

BRONZE "RENEWO"
FIG. 73-P, 200 lb. S.P.
FIG. 16-P, 300 lb. S.P.

FIG. 1867-P
150 lb. S.P.
ALL-IRON

FIG. 1078-P
300 lb. S.P.
BRONZE

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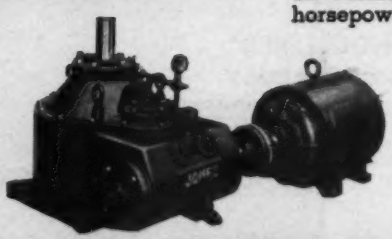
For driving agitators, mixers and similar equipment—

JONES WORM-HELICAL SPEED REDUCERS

HERE is a line of machines that fills a long felt need for double reduction units of the fully enclosed type to be used for agitators, mixers, etc. requiring a vertical shaft drive.

Many of these Jones units have established excellent performance records in a wide variety of service. As a result of that experience a complete standard line has been developed covering 15 standard ratios ranging from 40 to 1 to 250 to 1 for all common motor speeds and a wide range of horsepower ratings.

• This Jones Worm-Helical Speed Reducer on a lacquer agitator is typical of the wide range of services for which these drives can be used such as ore roasters, pulp tank mixers, furnaces, bending rolls and similar applications.



The new Jones Bulletin No. 75 covers complete details on these new Worm-Helical Speed Reducers, with rating tables, dimension diagrams, torque charts and other application information. We shall be pleased to send you a copy.

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nins are not only retained but actually are put to work. The lignins may be considered the binding material in the original wood, and by the explosion process the fibers are separated, not only without removal of the lignins but with a type of activation of this constituent.

Lignin activated in this manner can be re-welded under the proper conditions of moisture, temperature and pressure, and the resultant product has a "wood type bond" resembling the bond in the original tree and which is characterized by high strength, dry or wet. This is distinguished from what we term the "paper type bond" which may have high strength dry, but which loses strength rapidly on becoming wet.

The rebonding of the lignin bears some resemblance to the manufacture of plastics from thermo-setting resins. Once this bond has been properly made it does not appear to be reversible under any normal treatment; in other words, a finished piece of Presdwood cannot be defibered and remade so that it will be as good as it was the first time. It is apparent that in going through the activation of the lignins a change has been made which results in an irreversible reaction. This fact, together with the definite proof that the lignin passes through a plastic state, naturally led to an investigation of how far this plasticity could be developed and what characteristics would be secured in a product made by first securing substantially optimum conversion of the lignins to plastic condition. The resulting product is the lignin plastic, Benalite, which has essentially the properties of a phenolic laminated plastic and which is competing with such materials in the various fields.

At the present time, we are investigating making an activated carbon from wood which is hard and dense and equal in every respect to the better class of carbon from coconut shells. This is a very interesting development, because it may ultimately serve to make this country independent of imports of coconut shells for high-grade activated carbons for use in industrial applications as well as in gas masks in case of a national emergency.

At the other end of the scale from Masonite Benalite is the new product of Masonite Corporation, which is known as Cellufoam. So far as I know, this is the lightest structure ever made from wood fiber and differs from the other Masonite products in that it is not characterized by a lignin bond.

Passing through the range of low density insulation, we approach the types of products known commonly as structural insulation boards which fall in the general range of specific gravities of .24 to .40. Masonite's contribution to the range is Masonite Structural Insulation and Masonite Dubblseal Insulation, both of which are characterized by the lignin type bond and by extreme water resistance and wet strength. We next enter the wall board range, which can be roughly considered as between the specific gravities of .50 to .75. Many types of wall board will be found in this range, most of which are composed of ligno-cellulose which has simply been dried in paper or board form, the thinner ones being laminated with various binders to give the desired thickness. Masonite Quartrboard, which has a specific gravity of about .62 and a thickness of ¼-inch, differs from the others in that it is homogeneous in structure and without extraneous binders and the lignin type bond has been utilized.

Somewhat above this range we enter the field of densities of paper and paper board products which in general fall in the range of specific gravities of from .60 to .90.

We now enter the range of hard panel boards covering specific gravities of about .90 to about 1.3. Included in this range are Masonite DeLuxe Quartrboard with a specific gravity of .90, Masonite Predwood with a specific gravity of 1.03, Masonite Mascor with a specific gravity of 1.05, Masonite Tempered Presdwood with a specific gravity of 1.1, and Masonite S2S Presdwood with a specific gravity of 1.2. All of these boards are characterized by the lignin type bond, that of the DeLuxe Quartrboard, Presdwood and Tempered Presdwood being formed by application of high temperatures and pressures to the wet sheet, that of S2S Presdwood by application to the dry sheet of temperatures above the critical point, and that of Masonite Mascor by momentary application of pressure to a dry sheet in which the lignins have been preheated above the critical temperature.

This brings us back to Masonite Benalite with a specific gravity of 1.45 and which represents as far as we are now aware practically optimum utilization of the bonding powers of lignin.

A Champion in Paper Making Economies

WOODBERRY 887 Reinforced Dryer Felts

Record after record for low cost production falls before this new champion WOODBERRY 887 reinforced dryer felts. Asbestos yarns woven at intervals into the face of these long life felts greatly reduce dryer felt costs per ton of paper. They account for fewer shut downs, fewer adjustments and a comparatively low steam consumption. In WOODBERRY 887s, shrinkage and stretch have been reduced to a minimum. They continue in service making fine qualities of paper long after other cotton felts cease to perform at all. Specify WOODBERRY 887s for longer life and more economical operation.

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Automatic pH Control at the Machine

A. L. CHAPLIN & W. N. GREER
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To briefly present the subject of automatic control at the machine, it should probably be considered in three phases, namely:

I. Reasons for Automatic Control.
II. Control Layout.
III. Control Equipment.

There are five major reasons why *p*H is being controlled at the machine. They are:

a) Uniformity.
b) Retention.
c) Permanency.
d) Increased Wire Life and Decreased Corrosion.
e) Chemical Economy.

A given mill may be primarily interested in only one of these or may be interested in some combination of two or three of them. The optimum *p*H for one quality may differ from that value best favoring another but in general the most effective range lies in the upper values (4.5 to 7 *p*H) beyond that normally carried in the past.

One of the most important factors of concern in sheet formation is uniformity. Uniform acidity at the wire is essential to the formation of a uniform product.

The *p*H of the stock at the wire may vary because of a number of reasons such as variations in the furnish, variations in the reagents added, dilution with white water, variations in raw water supply, showers, etc. Especially in a closed white water system it has been found in many cases that acidity from alum builds up and effects formation at the wire.

Raw material, especially pulp, often varies so widely that it is impossible to main tain controlled *p*H in the higher ranges at the machine by constant rate chemical feed in furnish make-up at the beaters. This can only be done by proportioning feed to demand. By proportioning chemical feed to demand at the machine, the stock is maintained more uniform and is less dependent on previous treatment. With a normal furnish, *p*H progressively builds up in the system approaching the wire and the complex chemical reactions attending stock dilution magnify, at the machine, the variations existing in the beater furnish. Furthermore, the unstabilized acidity accompanying floc balance on dilution prevails at any *p*H within the range of floc formation and can only be overcome by controlling *p*H at the machine.

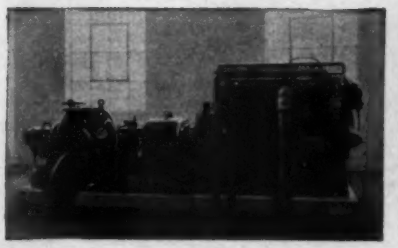
The effective *p*H range best favoring a reaction differs with chemicals used. By controlling those factors, particularly *p*H and type and concentration of chemicals known to affect the quantity of dye taken up and dispersed, optimum conditions for color retention at maximum uniformity are obtained.

Whether retention be considered a function of electrical charges of suspended particles or mechanical bonding of the floc, the result is equally dependent on types and concentration of chemicals used and the *p*H range of operation.

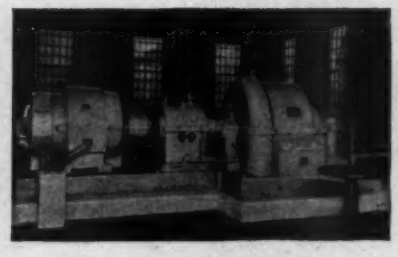
In a closed white water system, retention losses are at minimum because of recirculation and re-use of the water. An open system, however, is more subject to losses through the wire and depends on closer

Abridgments of some of the papers presented at the annual meeting of the Superintendents Association held in Cincinnati, Ohio, June 18, 19 and 20, 1940, appeared in the July issue. A second installment is published herewith.

Fig 7 (left)—Automatic control valve feeding alum to return white water in machine pit. Fig. 8 (center)—Continuous flow glass electrode assembly at Bird Screen. Fig. 9 (right)—Micromax automatic pH control equipment panel mounted.



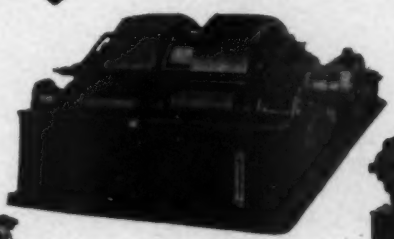
Centrifugal compressor in activated sludge service, driven through speed increasing gear by gas engine; 3000 cu. ft. per min. against 8 psi. at 6000 r.p.m. The engine speed is 1200 r.p.m.



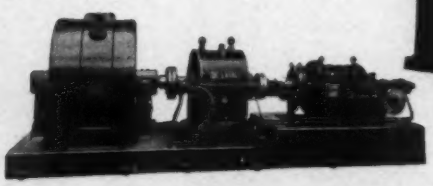
Three-stage gas booster driven at 4000 r.p.m. through speed increasing gear from 1750 r.p.m. motor; 16,650 c.f.m. against 7 psi.

Two-stage compressor in activated sludge sewage disposal plant; 13,500 cu. ft. per min. against 6 psi. at 3600 r.p.m. compressor speed and 1200 r.p.m. motor speed.

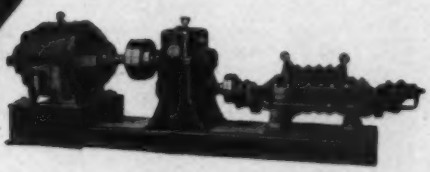
Speed increasing gear to transmit 6000 hp. from a 750 r.p.m. motor to a blast furnace blower operating at 3330 r.p.m.

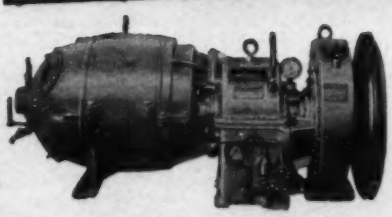


Six-stage descaling pump in a steel mill; driven at 2300 r.p.m. through speed increasing gear from 750 r.p.m. motor to deliver 1000 g.p.m. against 600 psi.



Six-stage boiler feed pump driven at 4000 r.p.m. through helical gear from 1800 r.p.m. motor; 125 g.p.m. at 218° F. water against 525 psi.





Single-stage blower driven at 15,000 r.p.m. through speed increasing gear from a 3000 r.p.m. motor; 1350 c.f.m. against 10 psi. gage.

SLOW speed motors joined by DE LAVAL GEARS to HIGH speed pumps and blowers

ALTERNATING current motor speeds are limited by the frequency and D.C. motor speeds by commutation difficulties, while internal combustion engines are of comparatively slow speed. ***However, choice of speed has important effects upon the design of pumps and compressors.***

If high pressure is generated at slow speed, too many stages and too long shafts are required, while splitting the unit into two parts increases cost and space requirements excessively. A high speed pump, on the other hand, has smaller impellers and a smaller casing and, consequently, lower casing stresses. The shorter shaft can be of smaller diameter, resulting in lesser leakage losses and in lower linear vane speed at the entrance to the first stage impeller, so that cavitation can be avoided without excessive positive head on the suction.

Such problems are neatly solved by DE LAVAL HELICAL GEARS, which make possible the use of standard speed motors with efficient, compact and reliable pumps and blowers.

The De Laval Engineering Department will gladly supply technical data for solving your individual problem. For information on:

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controlled conditions at the machine or auxiliary equipment for recovery. The range of most effective operation of some recovery units is also influenced by *p*H.

Printers have found that type and plates etch rapidly and inks fade when used on high acid (low *p*H) papers. Moreover, the paper itself is subject to a cracking, embrittlement and discoloration with age. Government and legal document paper in particular must have high permanency although within the past few years this specification has become more rigid and extended into other grades.

The extracted value of the finished paper is dependent on the technique and method of analysis although numerous variables at the machine affect the acid content of the finished paper. Furnish make-up and *p*H formation are most effective on the finished paper although it has been observed that temperature and rate of drying also influence the results obtained.

Of course, the actual value obtained on extracted measurements will not agree with the machine *p*H but with variables controlled the differential remains constant and by operating the machine at the required *p*H to give the desired extracted value, uniform control results.

Some chemicals are more corrosive at a given *p*H than others and *p*H in itself is not the complete criteria of corrosion. However, under usual machine operating conditions corrosive acidity is mostly due to alum hydrolysis and thus, by operating at higher *p*H, corrosion is reduced. Mills operating their machines at 5.5 *p*H and above have reported longer wire life than those accustomed to operating from 4.0 to 4.5 *p*H.

Some claims have also been made that an increase in felt life also attends controlled *p*H at elevated values.

If the required operating *p*H is in the upper ranges, it is impossible to control effectively by manual regulation and the mill man has resorted to the use of an excess of alum to stabilize acidity for the sake of uniformity. Paradoxically, a low *p*H demands more size, color and filler to compensate for losses and the effect of these chemicals on sheet formation is diminished.

By carrying the *p*H at higher values with automatic control in order to obtain the advantages possible, the savings in chemicals used have been a quite natural result.

Under automatic *p*H control the major portion of control chemicals are added in the machine system at some point of maximum dilution either at the sand trap, white water pit, or fan pump suction box, instead of adding all of the reagent at the beater as has been customary in the past.

The equipment involved for a complete automatic *p*H control consists of the Micromax *p*H recorder controller with control relay mounted on a panel, the electrode assembly and the valve and drive mechanism. The panel can be mounted wherever desirable but preferably away from the wet end of the machine where it will not be subjected to drenchings with water during wash-down periods and, of course, should not be mounted adjacent to the machine where it would be in the way when removing rolls or other equipment from the paper machine. It certainly should be placed in full view of the operators.

The electrode assembly is usually fed by gravity or in the case of control at the white water pit a sample is usually taken off on the pressure side of the fan pump. Previously, electrode assemblies were mounted and some are still so mounted directly in the sand trap, but in so doing they are subjected to breakage during clean-up periods unless suitable means are provided for protecting them. The valve drive mechanism is, of course, mounted at the point where it is desired to add the chemical reagent and the only point of interest here is that this chemical addition be made at a point in the process at which, or after which, there is good mixing so that the reaction is complete before this sample reaches the electrode.

The Paper and Pulp Industry and National Economy

E. W. TINKER
Executive Secretary
American Paper and Pulp Association

Recent world events and our national reactions to these events are of peculiar significance to the paper and pulp industry. Although the industry has always been susceptible to world conditions, probably never before has it been more vulnerable to such conditions than it is today. Many paper mills, hitherto dependent to a greater or lesser extent upon foreign grades of pulp, may in the near future, of necessity, use grades domestically produced. This would require ingenuity in manufacture and possibly some shifting in established sales and trade customs. Furthermore, the tendency to provide new installations to meet emer-

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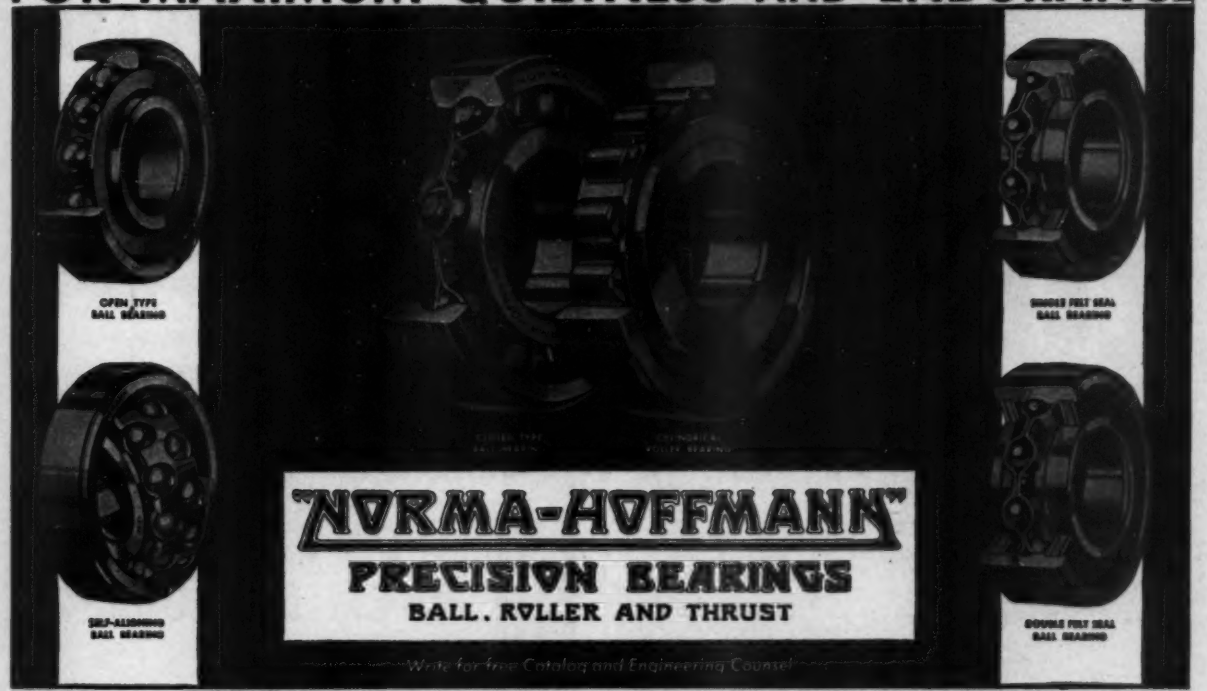

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gency conditions may accentuate the already acute competitive situation within the industry itself.

What the future holds in post-war days is a matter of grave concern; concern not only to executives in the industry but to all those who make their livelihood as a part of the industry. The possibility that with the conclusion of the war, conditions will be created in foreign countries in which extremely low wage scales will prevail and a vast post-war struggle for economic supremacy develop, will require formulation of new domestic policies and a rapid shifting of conditions in the American industry to meet foreign competition. Even now such new policy is being formulated. Clear thinking and clear foresight at this time are essential if we are not to undergo a tremendous economic disruption with extremely unfortunate conclusions, not only from a profit and loss standpoint but, more important, from the standpoint of the employment of people within the industry.

The paper and pulp industry has made an enviable record in the stability of employment which it has given to labor. Any disruption of this enviable record must be avoided. However, this will require real understanding not only within the industry itself but on the part of public officials and in fact the public itself. I have little doubt but that we can meet the post-war period successfully but co-operation and understanding are essential if we are to do so. As I conceive it, this is a matter concerning which the American Paper and Pulp Association should establish definite policies and develop definite objectives.

Of more immediate concern is the situation with regard to pulp supplies and more particularly of the grades of pulp available to the industry. The situation is critical and promises to become more so. Beyond this is the possibility that in the development of our national defense plans, so essential to national security, the industry will be materially affected in the general mobilization and planning that is taking place. If plans for national defense involve the planned allocation of skilled labor and of essential raw materials, and the development of a national plan regimenting industry, the effect upon the paper and pulp industry will be far-reaching. In my opinion it is of vital importance that all of us be currently and correctly informed not only as to the immediate facts but as to the likely trends if we are to protect our company and industry position in the future picture.

While you and I may or may not agree, we must recognize that there has been and still is a tremendous drift in the tide of industrial affairs towards control by the Federal Government. More and more the long arm of Uncle Sam is felt as this centralization takes place and more and more the trends in the government policy should concern industry. This is a fact and must be recognized as such.

In March an Industry Committee was appointed by Federal authority under the provisions of the Wage and Hour Act, looking to the establishment of a new minimum wage in the industry. This committee, with equal representation from labor, the public, and the employers, reviewed the situation and disagreed. Subsequently, additional hearings were held and a final opportunity will be granted on June 12th for the industry to present its case. To me one of the most interesting and impressive reactions was that of the six employer representatives appointed by the Government on the Industry Committee. With one exception these individuals represented mills paying well over the highest minimum wage that could be established in the industry. However, these six representatives unanimously stood in favor of a graduated increase rather than a sudden increase, in order to permit smaller and possibly less substantial mills to adjust themselves. This action was taken even though such mills were on a competitive basis. On June 20th hearings will start in the matter of establishing a minimum wage for all converters, and probably by the first of the year the Wage and Hour Administrator will have established a new base rate for the entire paper industry.

In other fields of activity legislation is pending in the Congress regarding waste disposal. The conceptions and proposals of fanatical proponents, if carried into legislation, might render economically unsound many individual mill operations and would in the end add to our unemployment burden. Also, of great concern to the industry, are the various proposals made to Congressional committees that would materially affect the cost of wood used by the industry. Illustrative of the breadth of government interest in the current industrial problems in the paper industry are the different proposals to carry beyond reasonable and satisfactory limits the matter of sanitation

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The paper and pulp industry is one of the major industries of the United States. Its record as an employer of labor and a contributor to the highest standards of living on the part of the people of the United States will compare favorably with any industry. The fact that it has never dramatized its efforts does not detract from the merits of what it has accomplished. It seems to me inevitable that the time will come when such action will be recognized as being in the public interest as well as in the interest of the individual industry concerned.

Paper Behavior in the Mill

V. L. SHAW, President
Perfecting Service Corporation

Paper behavior, and the need of paper control, is primarily of concern to the users and printers of paper. Mill men make paper for a purpose, and that purpose is to satisfy the needs of the printers and users of paper. The troubles that printers and other users of paper have is reflected back to the mill in the form of complaints, re-runs and charge-backs. It is these complaints and the resulting effect upon mill costs that make it necessary for the mill to do everything possible to improve paper performance.

The control of paper from a behavior standpoint is a double responsibility. The paper maker is responsible for making a good delivery to the user, and the user is responsible for protecting that good delivery against abuse and damage.

In order to more fully understand this problem, it is well to point out just how paper misbehaves in the plant of the user, particularly in connection with printing, and also, to point out the effect of moisture and temperature upon paper and how they affect the behavior of paper, both in the mill and in the printing plant.

Out-of-register is probably the most common trouble experienced by printers, and the cause for a large proportion of spoilage. Out-of-register can be caused from a paper behavior standpoint, by change of size of sheets, due to moisture gain or loss while printing, or between printings and also by mechanical distortion of sheets. Mechanical distortion of the sheet is caused by moisture changes or mechanical conditions that have distorted the sheet prior to printing. Out-of-register due to moisture change, and out-of-register due to mechanical distortion seemingly produce the same effect, therefore, most printers are apt to overlook the mechanical cause of misregister and have a tendency to blame all out-of-register on moisture. To distinguish between out-of-register due to moisture and out-of-register, due to mechanical distortion, requires close examination of the printed specimens. If a sheet is losing moisture, or gaining moisture during the printing operation, or between printings, the out-of-register will always be in one direction, and the indications will be that the sheet has either shrunk or stretched. In mechanical out-of-register the sheet may print smaller or larger, and of varying size, or it may print in register. This shifting of register is due to the sheet being distorted and not always seeking the same position with respect to printing.

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Fibers gaining moisture tend to increase in size and try to move in order to find room for such size increase. If their movement is resisted by adjacent fibers, which are also trying to move, pressure is built up within the sheet causing the sheet to buckle or move out of plane. Fibers, trying to shrink, pull away from each other. The mechanical lock of the fibers resists this movement and, therefore, the fibers stretch and produce a tension within the sheet. As long as this tendency to shrink, and the force of tension is within the elastic limit of the fibers, the sheet will be under tension and remain flat in plane. If the shrinking or tension force is beyond the elastic limit of the fibers, the fibers will be ruptured, the sheet will be weaker, and the fibers may then gain or lose moisture up to their normal size with very little effect upon the size or plane of the sheet.

Paper, as a single sheet responds, to atmospheric changes, differently than paper in a load. It is this law of relation of surface to mass, that has made it hard to prescribe methods for handling in the mill or press room, based solely on laboratory observation. In the laboratory, paper is handled as conditioned sheets, while in the mill and press room paper is handled as unconditioned loads and rolls.

Paper that is hotter than the room wil lose heat and moisture, and dry out at the edges first, causing the edges to shrink and tighten and give the load the appearance of being high in the middle. The heat and moisture loss will cause the load to dry out, too dry, to be in balance with the room. This dry paper will then begin to regain moisture from the room, which action will cause the edges of the load to grow and the paper to become wavy.

Cold paper in a warmer room will at once begin to absorb moisture from the air and will produce wavy edges.

Hot paper in a colder room, with air between the sheets, will act the same as cold paper in a warmer room.

Here we have an example of three different temperature conditions, causing the same effect, which fact, emphasizes the importance of analysis of causes before applying corrective measures.

It is not the relative humidity of the room that is the real cause of paper misbehaving. It is the relative humidity of a thin film of air immediately adjacent to the paper that we are concerned with. When a load of paper is the same temperature as the room, the load is living in an atmosphere of the same relative humidity as the room. When a load is not the same temperature as the room, the load is living in an atmosphere different than the atmosphere of the room. The atmosphere that the paper lives in, is the atmosphere of the room, changed to the same temperature as the load, but with a relative humidity that is caused by the room atmosphere being heated or cooled to the temperature of the paper. The atmosphere that the paper lives in, can only be determined by taking the known temperature and relative humidity of the room, and computing psychrometrically what the relative humidity would be when the room air has been changed to the

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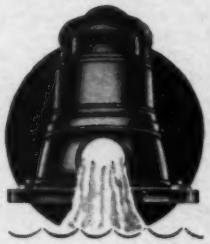

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temperature of the load. The air adjacent to the load will always be the temperature of the load, and the room air will be heated or cooled by the load whenever there is a temperature difference between the load temperature and room temperature.

Picture a section of a sheet of paper as a beam with a neutral axis. If the two sides of the sheet are alike, the sheet will respond evenly to moisture changes, and will remain flat. If one side of the sheet is more dense than the other, the dense side responds more slowly to moisture change, due to time lag. In case of moisture loss, the less dense side will lose moisture faster than the denser side, which will cause the less dense side to shrink, setting up a tension in the fibers on the less dense side and causing the sheet to curl to that side. In case of moisture gain, the fibers on the less dense side will absorb moisture more rapidly than the fibers on the dense side. This will cause the less dense side of the sheet to be under pressure, and would result in the sheet curling toward the dense side.

Curl around the grain is due to difference in density of the two sides of the sheet and usually finds its source in formation on the paper machine. It may, however, be due to more coating or size on one side of the sheet than the other.

Curl along the grain is usually due to a mechanical stretch of the fibers on one side of the sheet. This may be due to calendering, winding, embossing, passing over too small a roller, or breaker bar, or any other action that would mechanically iron or stretch the fibers beyond their natural formed limit.

Recent Developments in Pulp and Paper Water Purification

F. J. LAMMERS
International Filter Company

First let us consider carbonaceous zeolites, a new form of the familiar zeolite, which can be regenerated with acid to achieve new results in water treatment.

Carbonaceous zeolites are not natural substances, to any great degree. They are products of drastic treatment of coal, lignite or wood with hot acid, usually sulphuric acid. The acid treatment under controlled conditions, activates them, so that they will act like the siliceous zeolites and do still more. In other words, carbonaceous zeolites are essentially compounds of carbon which, when properly controlled, will exchange sodium for calcium or magnesium and make hard water soft.

In addition to that, they can be regenerated with acid. They will retain the hydrogen ions of that acid, and when water is passed through them will remove from the water not only calcium and magnesium which constitute hardness, but all cations, or common metals. They will turn the water acid in proportion to the amount of latent acidity in the minerals of the water.

The acid regeneration of these zeolites can be carried out in two ways. We may add an excess of acid, which is the common form of operation; in this case all potential acidity in the water will be formed. Not to be too technical, it forms an acid water which requires neutralization. That amount of acidity is a factor of the natural character of the water. It cannot be changed under that method of operation, and such acidity usually must be neutralized afterwards. It is sometimes imperative.

There is another method of removing alkalinity from water, especially carbonate alkalinity. Special carbonaceous zeolite can be regenerated with a controlled amount of acid—not an excess. After simple aeration to remove ordinary carbon dioxide, water from controlled regeneration will not be corrosive.

There is one other development using carbonaceous zeolite. If we pass water with neutral minerals in it through it as described, it takes the metal ion out and makes the water acid with what remains. This remaining acidity can be removed by passing the resulting acid water into a new, anion type of zeolite. Anion zeolites do not exchange cations or the hydrogen equivalents, but exchange anions—the other end of the compound—and take out the chloride, sulphate or other acid left, to make "distilled" water. This type of treatment, first with carbonaceous zeolite and next with anion zeolite, is economical, only up to about 400 parts per million of minerals in water. After that, ordinary steam distillation is less expensive.

These carbonaceous zeolites concern the pulp and paper picture in certain advantageous uses. The most frequent and useful applications involve removal of calcium and magnesium almost completely.

Boiler feed water is another prominent application. Special bleach and washing water may also require such treatment. Any sodium carbonate water, in which the min-

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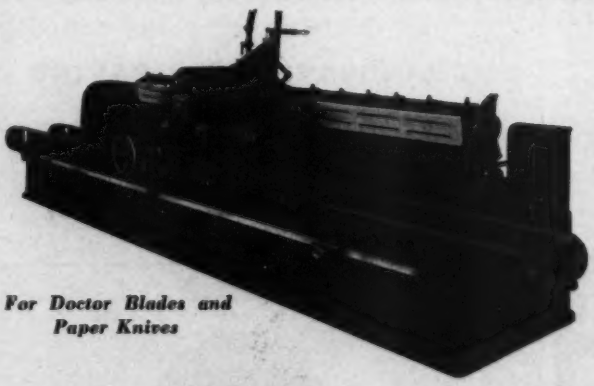

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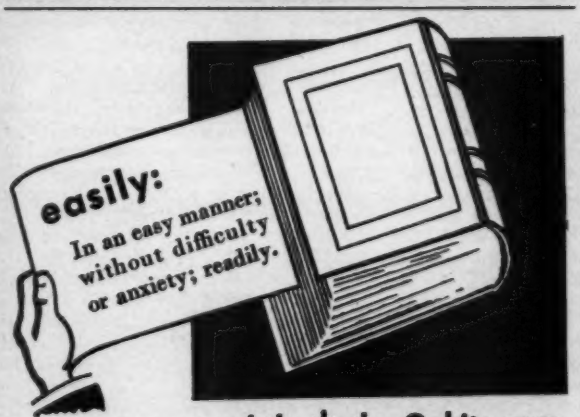

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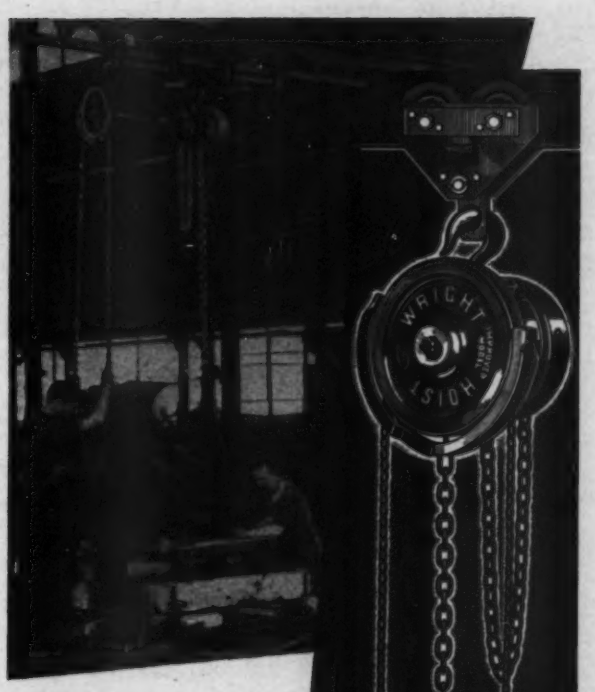

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Their bright glistening surface can be kept absolutely clean by a few minutes wash down with a hose—no slime, no concrete chips. Impervious to the action of ordinary stock fluids.

Manufacturers of wood tanks for 60 years

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KALAMAZOO MICHIGAN

eral is largely alkaline sodium carbonate, may be best treated with these types of zeolite. Summing up, we find carbonaceous zeolites find their best application wherever minimum silica, hardness, alkalinity or total solids are important.

The next general subject I should like to discuss is improvement in the old system of coagulation and settling, and removing suspended solids from water. As we remember, the old system commonly treated water by mixing a chemical directly into it.

That type of system is expensive, not only in amounts of chemicals used, but also in the first cost. The basins can short-circuit; they usually do. A theoretical capacity of four hours usually nets two to three hours; a two-hour design often yields about only one hour in operation.

For twenty or thirty years there has been extensive progress and research to improve these conditions; out of it there have been four recent and significant developments.

The first three of these comprise improvements in the same type of system, but improve the means of handling water, chemical and the resulting precipitates, so that new and better results are obtained. These constitute the Pirnie upflow basin, the Spaulding precipitator, and a newly introduced Dorr Hydrosoftener.

The Pirnie upflow basin changes former practice, to incorporate it more or less all in one tank. The water and mixing occur in a central tube; and distributor tubes radiate out from its bottom to distribute this mixed water throughout the bottom area of the tank. Instead of causing it to flow along horizontally, letting the solids settle out and taking off the water, a layer of the precipitated impurities (calcium carbonate in lime softening or precipitated floc in coagulation) forms and tends to settle down. The water from the radial distributor tubes, rises and must go through this constant blanket.

The Spaulding Precipitator is another improvement over former methods. Changing the basin shape, Spaulding gives it an outwardly flaring external section with a skirt inside, and mixes chemicals and water on the way in. Sludge and water together flow up through a narrow opening around the internal skirt, into an area of increasing cross-section. As the water rises it flows slower, because the area is larger as it goes up. Here the sludge blanket not only forms, but in this case the heavy particles are at the lowermost part, and the lightest particles are at the topmost part.

The Dorr Hydrosoftener brings water down a hollow shaft and through a hollow distributor, and distributes it over the bottom of a straight basin under a blanket of sludge. This seeks an even more perfect distribution, one physically created by mechanical movement instead of by water flow. By bringing the water into positive distribution under a layer of sludge, definite sludge contact of water and chemical is obtained.

These developments have permitted decreases in size of settling basins and improved results in turbidities leaving the basin; very substantial benefits have resulted.

The fourth development—the Infilco Accelator—employs a fundamentally different attack. Here we have a fundamentally different picture: we recirculate and return sludge in very large quantities without pumping, *before* we introduce the precipitating chemical under such conditions.

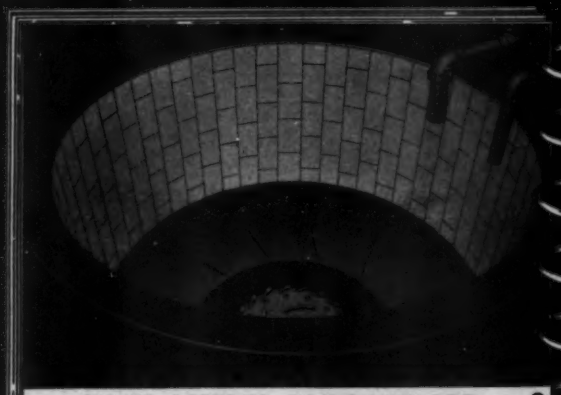
Treatment chemicals are diffused throughout this sludge and circulate with it; the circulation rate is three to five times the treated throughput. In that slurry zone of old sludge, tremendous surface areas are exposed; the chemicals do not go directly into the water at all, but into this sludge zone. Every particle of sludge is thus surrounded by a film of chemical ready to react.

This entire slurry system is then diffused with raw water to be treated. Reactions occur and are completed immediately—on the surface of the old sludge particles, of which the new precipitates become an integral part.

The Accelator has no slurry blanket or settling zone. The recirculated slurry continues to flow through its cycle, and the action at all times and at all places is a positively controlled moving circulation.

Treated water leaves the slurry zone as a sharply defined, clear layer. There are no intermeditae areas of partial clarification or cloudiness. One can look down, through ten feet of clear effluent and see the recirculated slurry flow beneath.

The water delivered by Accelator treatment, being only five to ten parts per million average turbidity, frequently does not need filtration. In cases where five or ten parts per million of turbidity are not critical—and that covers a vast portion of pulp and paper operations—filters may be omitted. Under those conditions, the first cost and the operating cost of the plant is greatly reduced.



DILTS-COWLES HYDRAPULPER

Within 10 to 15 minutes a load of 3000 or more pounds fed into the Dilts Hydrapulper in complete bales, laps or slabs—is fully pulped to any desired consistency.

Not only does the Hydrapulper pulp faster and for less money but it pulps more uniformly. Yesterday's pulping equipment seems antiquated when compared with this surprising new unit.

The Dilts Hydrapulper has a place in every paper plant—its application to batch or continuous systems seems unlimited.

COWLES CLASSIFINER

71 years of Dilts engineering experience and skilled craftsmanship are back of the Cowles Classifiner. Small wonder then that this machine is the industry's most efficient unit for defibering and clarifying waste paper stock.

The Cowles Classifiner is designed to fit into present systems, or into the special Dilts stock preparation systems. It requires only 1/10 the space—uses far less power—and still turns out a greater volume of work than is produced by old type equipment.

Dilts **Dilts**

DILTS MACHINE WORKS, Fulton, N. Y.
Division of The Black-Clawson Company, Hamilton, Ohio

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Throughout the nation, wherever skilled workmen are striving to produce the best quality papers—papers of standard, uniform quality—and at lower production cost, there you will find felts being used that were made in SKANEATELES FALLS, N. Y.

The greatest tribute that can be paid to the quality and dependable service of our felts is the fact that they are preferred by the men at the machines.

For speed, long life, dependable service and the finest finish, be sure to select felts made in SKANEATELES FALLS, N. Y.

The Waterbury Felt Co.
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TECHNICAL DEVELOPMENTS

The following abstracts are of the latest developments found in the foreign press.

Fiber Fractionation as a Control Method in Sulphite Pulp Studies

A Bauer-McNett classifier was used with beaten and unbeaten sulphite pulp. Studies on individual fractions were made. The equipment is described together with its operation. Graphs are given, indicating in general that breaking length, Mullen, tear, freeness and folding strengths of the sulphite pulps become lower with decreasing fiber length. The Strindling fibrage catcher is described. It consists of a radially installed row of knives in a revolving drum, revolving at 3 r.p.m. in 0.3-0.4% stock. Most of the long fibered pulp is caught on these knives and washed off with a spray. The application of this may be the selection of longer fibered stock. E. N. Holtan. Svensk Papperstidn. 43, No. 7, 122-8 (1940) through Bull. Inst. Paper Chemistry, 10,429 (1940).

Piled Pulpwood Deterioration

Eight years ago an experiment was made to determine the rate of pulpwood decay under varying conditions, as affected by wood species, peeling, site of storage, and season of cutting. The experiment was carried out at Eagle Depot, in the Gatineau drainage basin of Quebec. Species used were black and white spruce, balsam, and jack pine of commercial sizes—cut into four foot lengths and piled on skids. Half of each pile was peeled. One pile was stored in a dry, open field; the other in a swamp. Four sets of such piles were established at different periods of the year. Peeling seems to have the greatest effect upon rate of decay. In every case peeled wood was more durable than unpeeled wood. Some unfavorable results of peeling (e.g. cracks in black spruce) were noted. Peeling served as the greatest deterrent to blue stain and red stain, especially in black spruce. Jack pine, peeled or not, was heavily stained. This same species decayed readily irrespective of site. In other instances, the woods remained in better condition in the dry state. Accumulation of organic debris retaining moisture, favors decay. Seasonal variation in cutting had no pronounced effect on the results of this series of experiments. Cutting was done in early September, mid-October, early December, and June. C. G. Riley. Pulp and Paper Magazine of Canada. Vol. 41, 450 (1940).

Coating Machinery

French methods for coating paper on one or both sides is discussed, with special reference to recent improvements in French machines. Diagrams are given, and the importance of cleaning brushes emphasized. American coating machines are also described. In Europe the almost universal practice is to use festoon drying for coated papers. The authors also outline air-conditioning, heating, and ventilating problems. M. Argy and H. Lhomme. Papeterie 62, 138-145; 171-175; 201-7 (1940).

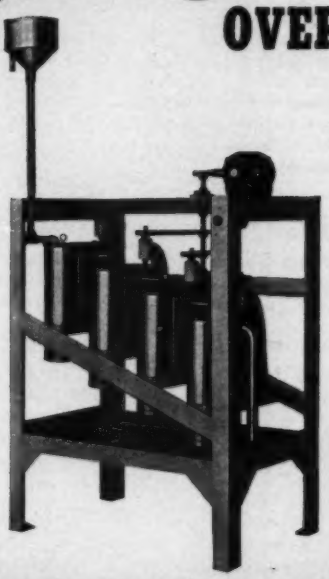
Chipping Wood and Its Effect on Sulphite Pulping

In various pulp mills, chips were found which contained 10-15% of wood subjected to high compression. The greatest part of this damage was done during chipping. Crushed wood has a very marked effect on pulp strength as shown by a series of systematic experiments. This is true both for beaten and unbeaten pulp and affects bursting strength, tear, breaking length, and folding endurance. Damaged chips were so chosen that they could be cut approximately in half, one half representing the sound chip and the other half the damaged ends. Sulphite cooks were run on the two series. Pulp yields were almost identical from these two series, but the sound half of the chip gives a pulp almost 30% stronger than the crushed half. Thus elimination of the damaged wood from a chip in these experiments would result in pulp about 15% stronger than that found in a sound chip. However, wood damaged by chippers is of no special interest to pulpmakers who find their ordinary run of pulp adequate in strength. When strength improvement is required, however, investigation of the chipping process is in order. Here, too, the moisture content and the temperature of the wood during chipping, adjustments and the speed of operation of the chipper, and nature and extent of stresses necessary to cause fiber degradation, may be of importance. H. Green and F. H. Yorston. Pulp and Paper Magazine Canada, 41, No. 2, 123-6 (1940).

Grinding Temperatures and Mechanical Pulp

There are contradictory results in the literature on the influence of temperature in the manufacture of groundwood pulp. In certain instances, it appears, an increase in temperature resulted in the saving of power, and a decrease in pulp quality. In others apparently power savings were obtained together with improved pulp quality. Other investigations showed increases in power consumption with or without pulp quality improvement. Neither the condition of grinding surface nor moisture content of the wood had received special attention in the past. In the present experiment the authors used the same grindstone but with 4 different grinding surfaces (smooth, slight, medium, and strong burring). Cold grinding was begun at 28 deg. C. and subsequently raised through 45 deg. and 60 deg. to the final 75 deg. C. Spruce wood, 75 years old, with a mean moisture content of 13.5%, and average density of 0.373 kg. per cubic decimeter was used. Constancy was maintained in the grinding angle, size of grinding plane, specific grinding pressure, r.p.m., depth of immersion of the grindstone in the pit suspension, and pulp density in the pit. There is a correlation between the effect of grinding temperature and the surface conditions of the stone. Despite rising temperatures, with smooth stones, the increase in output is slight. There is increased power consumption, and the pulp is stronger and has longer fibers. With medium burring which simulates the commercial conditions used in newsprint manufacture, change to hot grinding is definitely advantageous. The power consumption drops, output is increased and the pulp properties improve. With rough stones temperature increases cause decreased power consumption, increased output, but with the formation of coarse pulp whose properties are not improved. When burring of the stone is extreme, the pulp quality drops. The present results serve to explain past discrepancies in part. The moisture content appears to accentuate the effects of temperature, especially with burred stones. W. Brecht, W. Müller, H. Schröter, and R. Süttinger. Papier-Fabr. 28, 53-8; 61-4 (1940) through Bull. Inst. Paper Chem. 10, 381 (1940).

Accurate AND CONVENIENT CONTROL OVER STOCK PREPARATION



- The Bauer Classifier is the outstanding device for determining the physical characteristics of your stock.
- Gives precise and accurate data for control work.
- Used by mills in all branches of the industry.
- Designed and built for long-time, convenient, and trouble-free operation.
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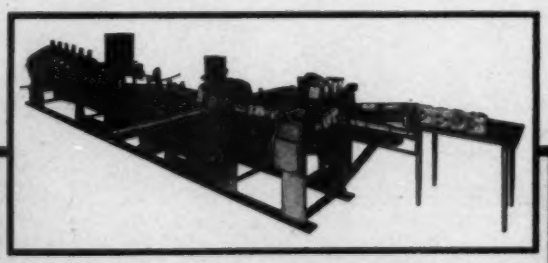

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Fully automatic, this rotary-type wrapping machine is capable of the highest possible speed production.

No cams, no reciprocating movements.

Wrappers are fed from continuous roll.

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Duriron for Alum . . .

Duriron Dissolved Alum Systems—dissolving jets, pumps, valves, pipe and fittings—give you exact control of the alum going into the beaters.

Too little alum, and you get poor sizing and lower paper strength . . . too much makes the paper brittle, corrodes the wires and deteriorates the felts.

The Duriron Dissolved Alum System will help you make better paper, at lower costs.

Durichlor for Bleach

Durichlor pumps, valves, pipe and fittings are ideal for making up and handling bleach liquor and for chlorinating water. There's no corrosion of the equipment . . . no contamination of the liquor . . . no expensive and time-taking replacements to make.

Write us when you are in need of corrosion-resisting equipment—we can furnish you standard or special equipment in the most suitable alloy.

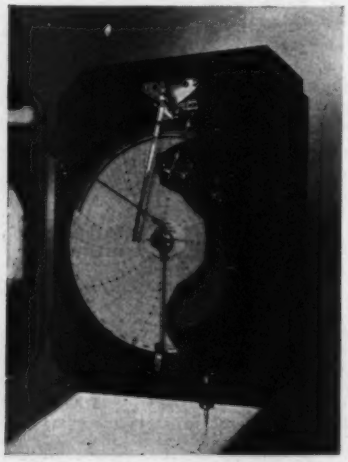
The DURIRON COMPANY, Inc.
General Offices and Plant: DAYTON, OHIO

NEW EQUIPMENT AND SUPPLIES

New Line of Recorders

Taylor Instrument Companies, Rochester, N. Y., has announced a new line of recorders for temperature, humidity, pressure, load, rate of flow, liquid level, and receivers for pneumatic transmission systems. Exclusive of the controller mechanism, the recorders and recording controllers are identical.

The case is for both face and flush mounting. Standard case finish is instru-

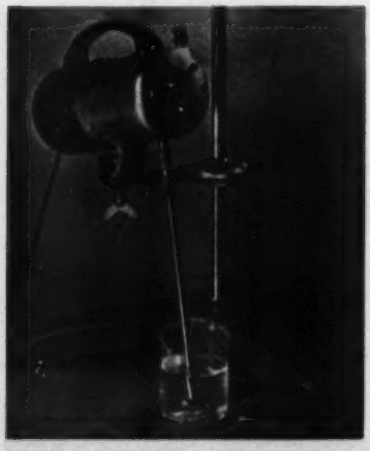


ment-black enamel, or white if specified. A die-cast aluminum chart plate gives a rigid surface for pencil notations on chart and for carrying the chart clamp and pen lifter.

Instruments are available with 10-in. or 12-in. charts, and with one, two, or three pens. Links, pivots and pen arms are of 18-8 stainless steel.

Laboratory Mixer

Mixing Equipment Co., 1062 Garson Avenue, Rochester, N. Y., has announced a laboratory mixer with an adjustable speed



friction drive. A turn of a thumb screw increases speed up to a maximum of 1750 r.p.m., or decreases speed until mixer is barely turning over. Motor is totally enclosed. A carrying handle permits the mixer to be used without clamp or stand. Available in 110 or 220 volt, 60 cycle, one phase current, the mixer is recommended by the manufacturer for use with inflammable materials, for stirring constant temperature batches, and for making up standard solutions, test batches, and small production lots.

Treatment for Removal of Silica from Water

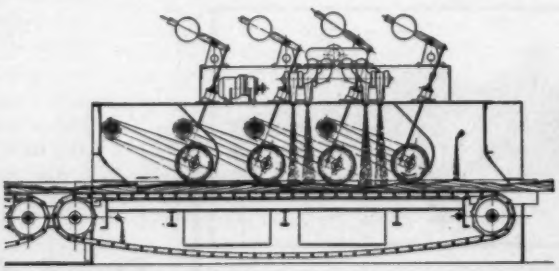
A special form of activated lime containing magnesia, designated as *Silimite*, has been developed by the Allis-Chalmers Mfg. Company, Milwaukee, Wisconsin, for silica-removal treatment of boiler feedwater, the silica being removed in hot process softeners. The calcium content of the lime is utilized in softening while the other constituents are effective in silica removal. In plant operation, the Silimite is slaked in accordance with a definite procedure. The slaked Silimite and soda ash are then introduced into the softener and the operation carried on in the same manner as with normal softening.

This new development is said to be of particular interest to high pressure steam plants.

Slab and Edging Barker

Allis-Chalmers Mfg. Company, Sawmill Division, Milwaukee, Wisconsin, has announced the development of a machine for barking slabs and edgings by means of water under high pressure.

The machine is designed to bark slabs having a width up to approximately 16 in.



and having a maximum thickness of 10 in. Such slabs, it is claimed, can be barked at the rate of four cords an hour, assuming the lineal feet represented amounts to about 800 ft.

The slabs are fed bark side up onto bed chains by means of feed conveyors. Chain speeds may be varied to suit material being barked. They are synchronized with the speed of press rolls that work in conjunction with the bed chains.

The main frame of the machine is of heavy plate construction with hinged baffle plates, front and rear, to allow entrance and exit of the slabs. Baffle plates to protect the operator from water spray and removable doors for inspection and adjustment are provided. A cast steel water manifold with bronze elbows and oscillating nozzles is mounted on top of the frame.

Jet water is provided by a 3550 r.p.m. motor driven high pressure centrifugal pump. Smaller motors are provided to operate the main machine and auxiliary drives.

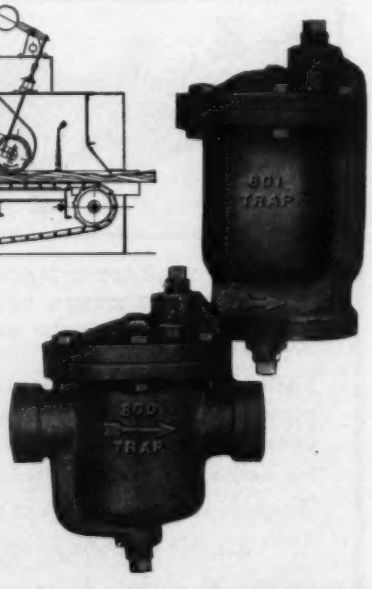
A separate compartment for barking edgings can be incorporated within the main machine. This compartment has a bed chain of special construction and pressure members to hold the edgings against the chain. The bark is removed from two edgings at a time. The drive for this part of the machine is separate and need be operated only as required.

Wet Strength Paper Process

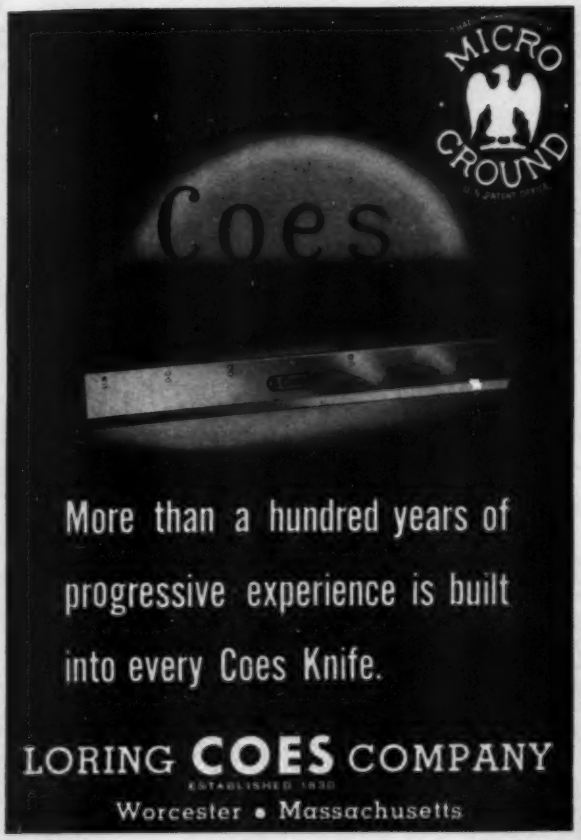
H. Scherbak, engineer and inventor, 15 East 69th St., New York, has announced a process for making wet strength paper. The process is new to this country but is employed by several European mills. It makes use of a special size, and requires few equipment modifications in its adaption to existing operations.

Small Size Steam Traps

Two new steam traps have been announced by Armstrong Machine Works, Three Rivers, Michigan, to supersede its 200 Series traps. One of the new traps is designated as *No. 800;* the other, as *No. 801.* The No. 800 trap is for use on straight-through pipe connections; the No. 801, for standard angle connections. Both of the traps have the inverted bucket operating principle, free-floating valve mechanisms, self-scrubbing action, heat-treated chrome steel valve seats, and stainless steel valve levers.



Among the features of the new traps, cited by the manufacturer are: more rugged construction, freer flow of water, one-piece stainless steel bucket, and single casting size for both ½ and ¾ in. pipe connections.



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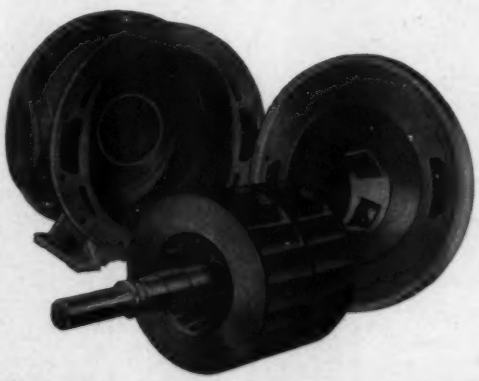

NASH VACUUM PUMPS HAVE ONE MOVING PART

Operating advantages made possible by the Nash principle, and present in no other type of vacuum pump, permit a new level of operating economy. Nash Vacuum Pumps have but one moving part, a rotor cast in one piece, and revolving without metallic contact. There are no valves, no pistons or sliding vanes, no internal parts requiring wear adjustment or lubrication.

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For over a half century—sixty-two years to be exact—this veteran wool expert has been sorting the choice fleece used in Orr Felts,—the highest grade wool that money can buy. Long time experience enables Orr wool sorters to accurately separate a fleece into its seven to ten various grades—choosing the grade best suited for each individual felt.

Orr buys wool from all corners of the world, insisting on absolute top quality. Here is one of the reasons that Orr Felts are specified by hundreds of paper and pulp mills. These mills know from experience that choice wool has much to do with long felt life and maximum water removal. Next time, order Orr Felts for your machine.

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For Testing Porosity—Stiffness—Smoothness — Softness — Sizing

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Improved Model No. 4110

The Standard Porosity Tester

The Gurley Densometer is the standard instrument for testing paper porosity, hence its formation and tendency to absorb ink, wax, or other liquids and coatings.

Described in Bulletin No. 1490.

W. & L. E. GURLEY

America's Oldest Instrument Makers

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Knife Grinder

Harris-Seybold-Potter Company, Seybold Division, Dayton, Ohio, has announced a newly designed knife grinder. The machine designated as the Seybold Precision Knife Grinder, is a high speed unit with automatic grinding wheel feed and centrifugal pump cooling system. A unique feature of the grinder is a hollow three-sided knife

bar, each surface presenting a different series of angles to the action of the traveling grinding wheel. A fourth open side makes it easy to bolt or clamp various types of blades to the bar.

In designing the new machine, special consideration was given to shear blade grinding. A variety of sizes can be accommodated and up to 6 in. widths can be ground satisfactorily. The adjacent surfaces of the knife bar are made to accommodate almost all straight edge knives that are in general use, such as chipper, barker, paper and rag cutting knives, and scraper or doctor blades.

All gears and clutch of the grinder operate in an oil bath. Adjustments and controls of the machine are simple.

The new grinder is made in three standard sizes—70, 100, and 128 in. lengths. Other sizes are made to order.

Heavy Duty Gear and Shafting Alloy

Joseph T. Ryerson & Son, Inc., Chicago, has announced that S. A. E. 4815, a carburizing nickel-molybdenum steel, has come into prominence for heavy duty gear and shafting applications. In the normalized condition, its machining properties compare with S. A. E. 4615 and S. A. E. 2315 in respect to cutting speeds and finish. An outstanding advantage of S. A. E., according to the announcement, is the high core strength which may be developed by single quench treatment.

The new alloy is carried in stock by Ryerson in hot rolled rounds (not annealed) in diameters ranging from ½ to 6 in. inclusive.

Fluid Drive Applied to Process Equipment

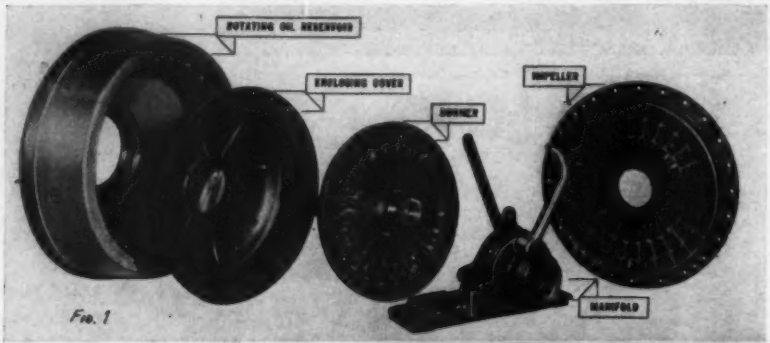
The *Scoop Control Fluid Drive*, or Hydraulic Coupling, made by American Blower Corp., Detroit, has been applied to vacuum filter (save-all, thickener) drives by Sherbrooke Machineries Limited, Sherbrooke, Quebec.

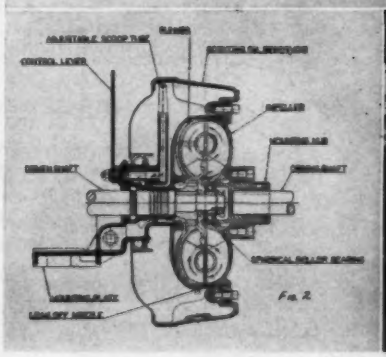
The drive employs the basic principle of torque transmission through oil, without any mechanical connection between the driving and driven members. It has a radially vaned impeller (Figure 1) which, when rotated at high speed, whirls the oil into a similarly vaned, concave runner, thus effecting a transfer of torque and rotation. The runner and impeller, with an enclosing cover, comprise the essential parts of the fluid drive.

The position of an adjustable scoop tube, mounted eccentrically on a stationary manifold (Figure 1) and pivoted so that it can swing through an arc of about 70 degrees within the rotating oil retaining reservoir, determines the output speed. With the scoop tube in its "full dip" position (Figure 2) and held stationary, it picks up all of the oil in the outer casing, carries it through a cored opening of the manifold and into the working circuit to transmit maximum power and speed. (Since oil is the medium through which the fluid drive transmits power, the maximum of power is delivered through the coupling when the working circuit is full.) With the scoop tube set in fully retracted position so that it carries no oil to the working circuit, the oil in the working circuit automatically empties into the reservoir and power transmission ceases. An infinite number of speed and power variations is obtainable by setting the scoop tube in intermediate positions between "full dip" and retracted.

A float valve in the tank of the Sherbrooke filter is linked directly with the control arm of the fluid drive to provide automatic control of output speed.

The *Scoop Control Fluid Drive* is one of four types of fluid drive, the other three being designated as traction, variable speed, and marine. Made in sizes varying from 2 hp. to 36,000 hp., the fluid drive is used in connection with both electric motors and internal combustion engines for applications which involve difficult starting, shockless drive and acceleration, connection and disconnection of loads, protection against overloads, variable speed, and the absorption of torsional vibration.





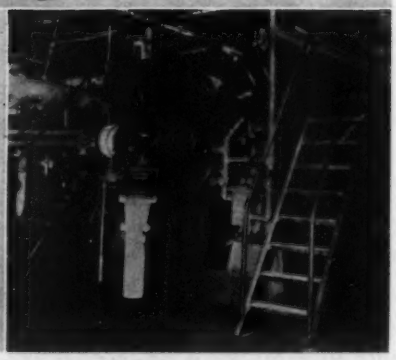


Fig. 1—Essential component parts of Fluid Drive. Fig. 2—Scoop Control Type Fluid Drive in cross section. Fig. 3—Fluid Drive installation on save-all.

THE DRAPER FELT

Unexcelled for strength, openness, resiliency, and general running qualities. Made to meet the most exacting conditions on all types of machines and all kinds of papers. Only one grade and that the highest.

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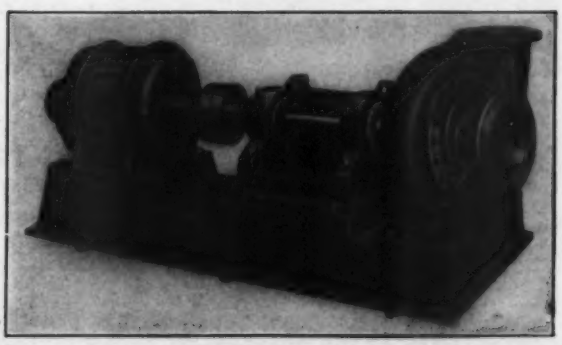

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PAPERMAKING PATENTS

IN THE UNITED STATES—Compiled by James Atkins, Registered Patent Attorney

Inquiries should be addressed to James Atkins, Munsey Building, Washington, D. C.

Cylinder Paper Machine

Patent No. 2,191,999. Wilhelm Thaler, Heidenheim-on-the-Brenz, Germany, assignor to American Voith Contact Co., Inc., New York, N. Y., a corporation of New York. Application September 15, 1937, Serial No. 163,907. In Germany September 18, 1936. 1 Claim. (Cl. 92—43). In a cylinder paper machine having a rotatable cylindrical sieve and a stock vat partially surrounding the same for holding stock, whereby a sheet of fibers is formed on the sieve during its rotation in the stock vat, the combination therewith of a stock guiding device disposed at the outlet of the stock vat, having a wall upwardly inclined to the sieve surface forming a narrow nozzle-like converging space therewith, the highest point of said wall being nearest the sieve surface, and having a second wall downwardly inclined to said first wall from said highest point to cause fluid to flow away from said highest point and to prevent fluid accumulations at said highest point, and having a third wall facing the stock flow at the outlet of the stock vat inclined to the first wall and forming an acute angle therewith, said third inclined wall having a concave curved portion to receive the stock not entering the nozzle-like space and divert it in a curved uninterrupted flow away from the sieve.

Method of Removing Wax from Waxed Paper Stock

Patent No. 2,186,609. Otto Kress, Appleton, Wis., assignor to The Institute of Paper Chemistry, Neenah, Wis., a corporation of Wisconsin. Application May 5, 1937, Serial No. 140,385. 10 Claims. (Cl. 92—3). The method of separating waxy materials from waxed paper stock, which comprises defibering the stock in an aqueous medium, adding to the fibers an aqueous mixture consisting of a water-soluble emulsifying agent and an alkali solution of a water-insoluble, alkali-soluble, acid-precipitable protein, agitating the mass so as to form a stable emulsion of said waxy materials and separating the emulsion from the defibered stock, whereby there is produced substantially wax-free fibers.

Paper Making Machine

Patent No. 2,186,171. William Hulse Millspaugh, Sandusky, Ohio, assignor to Sandusky Foundry and Machine Co., Sandusky, Ohio, a corporation of Ohio. Application June 19, 1936, Serial No. 86,171. In Great Britain June 21, 1935. 2 Claims. (Cl. 92—49). A paper making machine comprising a Fourdrinier making wire, a first press comprising a lower suction roll and an upper smooth surfaced pressure roll, said suction roll having an upper suction box adjacent the bottom of the smooth surfaced pressure roll adapted for water removal, and an endless felt arranged to travel forwardly between the making wire and the suction roll and then upwardly and backwardly through the bite between the two rolls to present the wire side of a wet web of paper taken from said making wire directly to the smooth surfaced roll at the first press bite, a second press above and back of the first press and comprising an upper roll and a lower roll having a stationary lower suction box arranged to transfer the web from said endless felt after the web passes through the bite of the first press.

Paper Drying System and Apparatus Therefor

Patent No. 2,192,168. John W. Bell, St. Catharines, Ontario, Canada. Application September 17, 1937, Serial No. 164,417. In Canada October 6, 1936. 3 Claims. (Cl. 34—24). The method of drying a web of paper or the like, which comprises passing the web about rolls heated by steam at a pressure above atmospheric and enclosed in a chamber provided with slots through which the web enters and leaves the chamber whereby the steam evolved from the drying web fills the chamber, withdrawing the evolved steam from said chamber at a rate less than it is evolved from said paper and delivered to said chamber, whereby part of the steam escapes through the slots and prevents the entrance of air to the chamber, compressing said withdrawn steam and delivering the compressed steam together with additional steam from another source to the rolls as heating medium therefor.

Method of Recovering the Solids from Pulp Mill Waste Liquors

Patent No. 2,182,428. Erling Fladmark, Lawrence, Mass. Application November 11, 1935, Serial No. 49,248. 1 Claim. (Cl. 159—48). The method of recovering the solids from pulp mill waste liquors which consists in continuously spraying the liquor against the surface of a body of heated liquid heat transfer medium within an evaporator at such a rate of flow that the water of said waste liquor is evaporated upon contact with said surface before the waste liquor and liquid heat transfer medium can mix while the solid residue of said waste liquor is being continuously absorbed in dry condition by the liquid heat transfer medium and continuously removed from the evaporator with the latter.

Paper Making

Patent No. 2,197,463. Donald B. Bradner, Hamilton, Ohio, assignor to The Champion Paper and Fibre Company, Hamilton, Ohio, a corporation of Ohio. Application September 8, 1936, Serial No. 99,824. 1 Claim. (Cl. 92—21). A method of making starch sized paper which comprises the steps of incorporating raw starch in paper pulp, continuously forming a web of paper therefrom, heating the moving web throughout its thickness, in an enclosed space, at a stage where the web still contains enough water to permit complete gelatinization of the starch, to a temperature above the gelatinizing temperature of the starch, while supplying steam to said space and excluding air from said space to a degree sufficient to maintain the wet bulb temperature adjacent the web above the cooking temperature of the starch and restrain evaporation, whereby the starch is uniformly gelatinized throughout the thickness of the web.

Pulp Bleaching and Refining Process

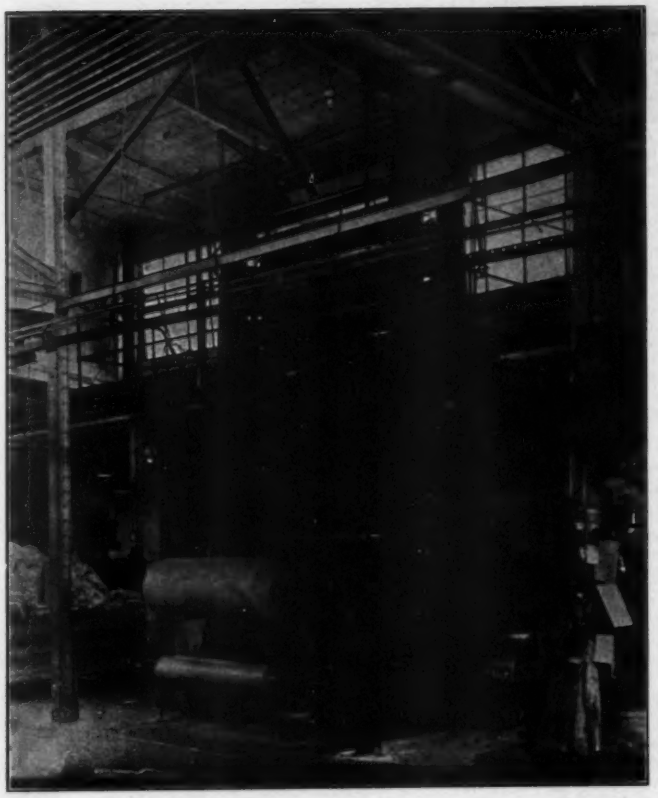
Patent No. 2,186,034. Harold R. Murdock, Canton, N. C., assignor to The Champion Paper and Fibre Company, Canton, N. C., a corporation of Ohio. Application August 24, 1937, Serial No. 160,720. 4 Claims. (Cl. 92—16). Process of preparing a bleached paper stuff, which comprises chlorinating the chlorinatable lignin compounds content of a chemically produced raw pulp by treatment of the latter with chlorine as such; solubilizing the chlorinated lignin compounds content by treating the pulp with mild caustic alkali solution and washing the so-solubilized compounds from the pulp; beating and partially hydrating the pulp to a degree just short of that required for hydrating the pulp to a degree approximating that required for papermaking; subjecting the substantially refined and hydrated pulp to an oxidizing bleach with an hypochlorite under conditions to bleach the pulp; and mechanically hydrating the bleached pulp, to the degree of hydration appropriate for papermaking, under mild hydration conditions.

Process for Recovering and Reusing Constituents of Waxed Paper

Patent No. 2,183,259. Arnold M. Hill, Orange, N. J., assignor to National Oil Products Company, Harrison, N. J., a corporation of New Jersey. Application March 3, 1937, Serial No. 128,792. 7 Claims. (Cl. 92—3). In a process for reclaiming the constituents of waxed paper "broke", the steps which comprise disintegrating the "broke" in water heated to a temperature sufficiently high to melt the wax constituent and emulsifying the wax with an agent comprising a mineral oil sulfonate and a sulfonated substance selected from the group consisting of animal and vegetable oils, fats and waxes.

Jordan Filling

Patent No. 2,197,182. Harry M. Keating, Lee, Mass., assignor to Smith Paper, Inc., Lee, Mass., a corporation of Delaware. Application September 25, 1937, Serial No. 165,631. 10 Claims. (Cl. 92—27). A refining engine of the Jordan type including a pair of relatively rotatable conical working members, one within the other, each having a plurality of circumferentially arranged working bars, and at least one of said members having its bars arranged in a plurality of series, the members of one series being interspersed among the members of the other and being of effective lengths gradually decreasing progressively toward the base of the cone.



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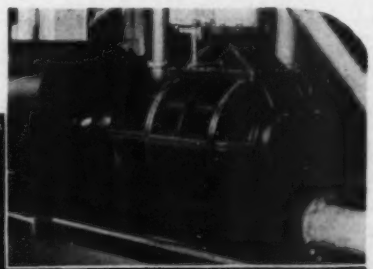

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New Catalogues and Publications

Blackhawk Mfg. Co., Milwaukee, Wis. —Products of this company are well-presented in a new catalogue (No. 40H) recently issued by the firm. The catalogue contains considerable data as to the company's line of hydraulic hand jacks, gauge-equipped jacks, floor jacks, high-pressure valves, hydraulic pipe and conduit benders. Installation and operating views are included in this release, as are price lists.

Brown Instrument Co., Philadelphia— A new catalogue (No. 6705) on this company's complete line of circular case thermometers and pressure gauges, indicators, recorders, controllers, including self-contained and portable models, has been issued recently. Seventeen constructional features of the firm's electric controller are illustrated and the principle of operation is described in detail.

Carrier Corp., Syracuse, N. Y.—This company has just published a simplified presentation of air conditioning in the form of psychrometric charts for normal and low temperatures. These charts make it possible to arrive at accurate solutions for all barometric pressures. The first chart is for wet bulb temperatures below 32 degrees; the second is for normal air conditioning ranges with dry bulb temperatures from 32 degrees to 110 degrees. The data from which these charts were plotted were contained in a paper presented by Dr. Carrier in conjunction with Professor C. O. Mackey of Cornell University in 1936. Fifteen examples are worked out showing the use of the charts. Engineers and executives in the industry would find much of interest in this publication (AC 127).

Condenser Service & Engineering Co., Hoboken, N. J.—A new lubricating oil cooler catalogue (No. 31) has been published recently by this firm. The catalogue explains the use and design of the oil coolers, includes construction details and considerable data relative to dimensions and capacity.

Detroit Hoist and Machine Co., Detroit —Several new circulars have been published by this company recently. Circular No. 695 describes the company's crane equipment, No. 801 deals with the Titan hoist while No. 725 describes the firm's general equipment All the circulars, containing numerous photographs, are punched for loose-leaf filing.

Robert Gair Co., Inc., New York City— The 1938 edition of 2,000 copies having been exhausted, the complete text book on "Sealing of Corrugated and Solid Fibre Containers," by J. D. Malcolmson, has been revised and a second edition has been printed. This book is generously illustrated and covers all kinds of closures. The informative 36-page book is available without charge to those interested.

Homestead Valve Mfg. Co., Inc., Coraopolis, Pa.—This company has published two new folders regarding Homestead valves and Hypressure jenny steam cleaners. Both folders contain interesting installation views of this equipment and both contain data relative to uses, dimensions, etc.

Mine Safety Appliances Co., Pittsburgh —A new descriptive bulletin dealing with the application of the all-vision facepiece recently added to this company's line of hose masks, has been published lately. The bulletin (EB-4) contains much of interest regarding the company's products, including literature relative to the sizes, weights and functions of the masks.

Northern Engineering Works, Detroit. —This company's "Super Cranes" are graphically described in a new bulletin (S-107) which presents paper mill installation views as well as others. Numerous types of cranes are shown in this release.

Northern Equipment Co., Erie, Pa.— Bulletin 428 recently issued by this company describes the Copes Flowmatic regulator, a simplified two-element steam flow type. Operating diagrams, installation photographs and performance charts are included in the release.

Oakite Products, Inc., New York City —This company's product, Oakite Compound No. 32—a material for the removal of water scales, rust, etc., from equipment—has been published recently. The 19-page, handy booklet contains much informative material concerning the uses of this material, including some data on paper mill de-scaling problems. Illustrations are included in this release (Form 4305-R1).

Patterson Foundry & Machine Co., East Liverpool, Ohio—A folder just recently issued by this company explains features of the firm's Type M-40 "Unipower" vertical agitator drive. The folder points out improvements made to this unit and explains features of its construction.

Permutit Co., New York City—A 12-page illustrated bulletin (No. 2357) relates the history of the development of deaerating heaters and presents the causes of corrosion of boilers and piping and methods for preventing such corrosion. The bulletin describes and illustrates the Permutit deaerating heater showing how the heater may be used with hot lime soda softeners, zeolite softeners, Zeo-Karb H and Na or Zeo-Karb Na plus sulphuric acid treatment.

Roller-Smith Co., Bethlehem, Pa.— Panel type 3-inch and 4-inch electrical instruments are illustrated and described in a new catalogue (4120) lately released by this company. Data concerning the various types of direct and alternating current ammeters and voltmeters, single and polyphase wattmeters and radio frequency ammeters and milliammeters are given. It is punched for loose-leaf filing.

Sarco Co., Inc., New York City—A new catalogue (No. 52) covering this company's line of self-operated temperature regulators for controlling flow of steam, gas, water or brine has been published lately The sixteen-page release, punched for loose-leaf filing, contains numerous illustrations and drawings. A feature of the catalogue is complete capacity tables for several different valve styles to meet control problems in connection with industrial process work, water heating, air conditioning, etc.

Stephens-Adamson Mfg. Co., Aurora, Ill.—A brand new folder covering this company's complete line of hand and motor winches has been released recently. The bulletin (340) contains drawings and photographs explaining various features of the equipment.

U. S. Electrical Motors, Inc., Los Angeles, Calif.—Design and operation of this company's single phase motors makes up the reading matter of a new booklet published by this firm. The booklet deals with the mechanical and electrical characteristics of single phase, capacitor start motors and is illustrated with diagrams and charts.

Wallace & Tiernan Co., Inc., Newark, N. J.—A 52-page illustrated booklet published by this company assembles under one cover reprints on three phases of "Microbiological Control in Pulp and Paper Manufacture." The first reprint outlines recent developments in treatment with chlorine, chloramines and cupra-chloramines. Of particular interest to mills manufacturing stock for food and milk containers is the discussion on "Break-Point Chlorination." The second paper contains observations based on operations at the Oswego Falls Corporation and the Sealright Company, Fulton, N. Y., and outlines methods and controls used by mills to permit production of paper with low bacterial count. Economies resulting from slime control in newsprint production are set forth in the third paper. This booklet contains a large number of photomicrographs of common organisms found in paper mill systems. This booklet should be in every paper mill library. The booklet (Technical Reprint No. 472) may be obtained from the company.

BOOKS

Standard of Heater Exchange Institute (Deaerator and Deaerating Section)— Priced at 75 cents a copy, by the Heat Exchange Institute, 90 West Street, New York, N. Y., this paper-covered publication of 12 pages (8½ in. by 11 in.) contains recommendations on nomenclature, definitions, types and standards of construction, rating standards and guarantees, accessories, and a typical specification. The specification is intended as an aid to engineers in the preparation of complete specifications for deaerating units.

Permanence and Durability of Paper— This paper-covered volume by Morris S. Kantrowitz, Technical Director; Ernest W. Spencer, Assistant Technical Director; and Robert H. Simmons, Associate Chemist, each of the Division of Tests and Technical Control, United States Government Printing Office, is an annotated bibliography of the technical literature covered by the title from 1885 to 1939 inclusive. The abstracted articles, totaling nearly 300, have been placed in inverse chronological sequence of their publication dates and in alphabetical order by authors, or, if their names do not appear, by the article titles. References are numbered consecutively, these numbers also appearing in both an author and a subject index, to permit quick location of the desired data. The publication is designated as Technical Bulletin No. 22.

Printing Inks—Their Chemistry and Technology—Written for chemists who are groping for information on printing inks, this book is a volume of more than 550 pages. It is an extensive treatise that discusses the history of printing inks, printing ink vehicles, driers, printing ink modifiers, pigments, typographic inks, planographic inks, intaglio inks, photo-mechanical preparation of matrices, transfer inks, emulsion inks, special printing inks, printing inks for miscellaneous purposes, printing ink problems, testing of printing inks and paper for printing. In addition, there is an extensive glossary, a name index and a subject index. Bibliograhical references are numerous. The chapter on printing ink vehicles alone includes 318 of them. The exhaustive character of the work should make it a valuable reference volume to paper mill chemists, technologists, and others in the industry who in any way are concerned with the manufacture of paper that is later to be printed upon. Written by Carleton Ellis, Industrial Research Chemist, and published by Reinhold Publishing Corporation, 330 West Forty-Second Street, New York, N. Y., the book is priced at $7 a copy.

The Paper Industry and Printing in Japan—P. D. Perkins, the author of this small but extremely interesting paper-covered publication, divides his subject into three chapters. In the first chapter he treats of the development of foreign style paper manufacturing. The second chapter covers the development of Japanese style paper manufacturing. The development of printing is taken up in the third chapter. The price of the publication is 25 cents a copy; the publisher, Japan Reference Library, 500 Fifth Avenue, New York, N. Y.

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	per cwt.
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Corduroy	2.50 to 2.75
Cottons—	
Washables, No. 1	2.00 to 2.25
Fancy Percales	4.00 to 4.25
New Soft Blacks	3.50 to 3.75
New Light Seconds	1.75 to 2.00
New Dark Seconds	1.50 to 1.65
Khaki Cuttings—	
Mixed	2.50 to 2.75
O. D.	3.00 to 3.25
New Canvas	7.75 to 8.25
New Mixed Blacks	2.50 to 2.75
Shirt Cuttings—	
New White No. 1	7.00 to 7.25
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New Unbleached	6.75 to 7.00
Fancy	2.20 to 2.40

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f. o. b. New York City

OLD RAGS

	per cwt.
Roofing—	
No. 1	.90 to .95
No. 2	.80 to .85
No. 3	.70 to .75
Twos and Blues—	
Repacked	1.60 to 1.75
Thirds and Blues—	
Repacked	1.40 to 1.50
Miscellaneous	1.10 to 1.20
White, No. 1—	
Repacked	3.00 to 3.25
Miscellaneous	2.50 to 2.75
White, No. 2—	
Repacked	2.50 to 2.75
Miscellaneous	2.00 to 2.25

RAGS (Foreign)
ex dock New York City

NEW RAGS

	per cwt.
New Dark Cuttings	Nominal
New Mixed Cuttings	
New Light Silesias	
Light Flannelettes	
Unbleached Cuttings	
New White Cuttings	
New Light Oxfords	
New Light Prints	

RAGS (Foreign)
ex dock New York City

OLD RAGS

	per cwt.
No. 1 White Linens	Nominal
No. 2 White Linens	
No. 3 White Linens	
No. 4 White Linens	
No. 1 White Cottons	
No. 2 White Cottons	
No. 3 White Cottons	
No. 4 White Cottons	
Extra Light Prints	
Ord. Light Prints	
Med. Light Prints	
Dutch Blue Cottons	
French Blue Cottons	
French Blue Linens	
Checks and Blues	
Linsey Garments	
Dark Cottons	
Old Shopperies	

ROPE and BAGGING
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	per cwt.
Gunny No. 1—	
Foreign	2.30 to 2.40
Domestic	2.30 to 2.40
Wool Tares—	
Light	2.25 to 2.35
Heavy	2.40 to 2.50
No. 1 Scrap Bagging	2.00 to 2.15
Manila Rope—	
Foreign	4.75 to 5.00
Domestic	4.75 to 5.00
New Burlap Cuttings	3.25 to 3.50
Jute Threads—	
Foreign	3.25 to 3.50
Domestic	2.75 to 3.00
Strings—	
Sisal	2.25 to 2.50
Soft jute	3.00 to 3.25
Mixed	1.10 to 1.25

WASTE PAPER
f. o. b. New York City

	per cwt.
Shavings—	
White Envp. Cuttings	3.25 to 3.50
Ord. Hard White No. 1	2.50 to 2.75
Ord. Soft White No. 1	2.25 to 2.50
Soft White, Extra	2.75 to 3.00
Flat Stock—	
Stitchless	1.10 to 1.20
Overissue Mags	.90 to 1.00
Solid Flat Book	.80 to .90
Crumpled No. 1	.65 to .75
Solid Ledger Books	2.10 to 2.20
Ledger Stock—	
White	2.00 to 2.15
Colored	1.50 to 1.65
New B. B. Chips	.45 to .50
Manilas—	
New Env. Cuts	2.60 to 2.75
New Cuttings	2.00 to 2.15
Sulphite Mill Wrappers	.50 to .55
No. 1 Old Kraft	1.50 to 1.75
News—	
No. 1 Wh. News Cuttings	1.50 to 1.65
Strictly Overissue	.60 to .70
Strictly Folded	.50 to .60
No. 1 Mixed Paper	.40 to .45

CHEMICALS
f. o. b. shipping point

Alum (Papermakers)—	
Lump, cwt.	3.75 -
Ground, cwt.	3.50 -
Powdered, cwt.	3.90 -
Blanc Fixe—	
Pulp, bulk, ton	35.00 to 40.00
Dry, barrels, pound	.0300 to .0400
Bleaching Powder—	
Drums, cwt.	2.00 to 3.00
Casein (Domestic Standard)—	
20-30 mesh (bags), lb.	13.00 to 14.00
80-100 mesh (bags), lb.	13.50 to 14.50
Argentine, lb.	11.00 to 12.00
China Clay—	
Domestic Filler	
Bulk (mine) ton	7.50 to 15.00
Domestic Coating	
Bulk (mine) ton	11.00 to 22.00
Imported (ship side)	
Bulk (lump) ton	13.00 to 25.00
Chlorine—	
Tank cars (wks) cwt.	1.75 to 1.90
Gelatine (silicin), lb.	.53 to .55
Glyc. (C.P.) drums, lb.	.1250 to .1300
Litharge, powd., bbl., lb.	.0775 to .0800
Rosin (Gum)—	
New York, per 100 lbs.	
E, per bbl.	1.95
F, per bbl.	2.06
G, per bbl.	2.06
WW, per bbl.	2.90
Rosin (Wood), carlots	3.25 to 3.65
Salt Cake—	
Dom. bulk (wks) ton	16.00 to 17.00
Imp. bulk on dock—	
(Atl. ports) ton (Nom.)	20.00 to
Soda Ash—	
Bulk (works) cwt.	.90 to .95
Paper Bags, cwt.	1.05 to 1.35
Barrels, cwt.	1.05 to 1.35
Soda (Caustic)—Ammonia,	
Solid, drums, cwt.	2.30 -
Ground and flake, drums, cwt.	2.75 -
Sodium Silicate—	
60 deg., 55 gal. drums, (works) cwt.	1.65 to 2.00
40 deg., 35 gal. drums, (works) cwt.	.80 to 1.20
Starch—	
Pearl, 140 lb. bags, cwt.	2.80 -
Pearl, barrels, cwt.	2.90 -
Paper (Sp.) bags, cwt.	2.90 -
barrels, cwt.	3.00 -
Sulphur (crude)—	
(mine) bulk, long ton	16.00 to 20.50
Talc—	
Dom. 100 lb. bags (mine) ton	14.00 to 17.25
Imp. bulk, ton (Nom.)	23.00 to -
Titanium Dioxide—	
Barium Pig., bbls., lb.	.05½ to .05½
Calcium Pig., bbls., lb.	.05 to .05¼
Zinc Sulphide, bbls., lb.	.07½ to .07¾

CHEMICAL PULP
(Air-dry ton)

	per cwt.
Soda (Dom.) del'd. mill—	
Bleached, contract	3.30 -
Open market	3.40 -
Sulphate (Dom.) f. o. b. mill—	
Bleached	4.00 to 4.25
Kraft No. 1	3.25 to 3.50
Kraft, Southern, del.	3.25 to 3.50
Sulphate (Imp.) on dock—	
Bleached	4.50 to 4.75
Kraft No. 1	3.50 to 3.75
Kraft No. 2	3.25 to 3.50
Sulphite (For.)	
On dock—	
Prime bleached	4.00 to 4.25
Prime easy bleach	3.75 to 4.00
Prime strong unbl.	3.50 to 3.75
Sulphite (Dom.)	
Bleached, contract	3.62½ -
Bleached, open market	3.75 -
Unbleached, contract	3.17½ to 3.37½
Unbleached, open market	3.25 -

MECHANICAL PULP
(Air-dry ton)

	per ton
No. 1 Dom. & Can. (f. o. b. pulp mill)	34.00 to 37.00
No. 1 Imp. (On dock)—	
Moist	(nominal) 43.00 to 48.00
Dry	(nominal) 45.00 to 50.00

PAPER
f. o. b. New York City

	per ton
Boards—	
Binders	73.00 to 80.00
Chip	40.00 to 42.50
Chip, sgl. mls. lined	55.00 to 60.00
Coated, white patent .016	77.50 -
.020 and heavier	72.50 -
Kraft liner	55.00 -
News	40.00 to 42.50

	per cwt.
Book (coated)	
No. 1 Glossy Coat	11.90 to 13.50
No. 2 Glossy Coat	10.35 to 11.75
No. 3 Glossy Coat	9.55 to 11.00
No. 4 Glossy Coat	9.15 to 10.50
No. 2 Offset	7.70 to 9.00
A Grade M. F.	6.75 to 7.25
A Grade Super	7.00 to 7.50
B Grade M. F.	6.30 to 6.80
B Grade Super	6.55 to 7.05
B S. & S. C. Litho	6.80 to 7.30
B M. F. Litho	6.55 to 7.05
Ivory & India	.50 cwt. extra
Bonds (Rag Content)—	
100% Rag	39.10 to 46.00
Ext. No. 1	31.05 to 36.50
100% Rag	
85% Rag	
75% Rag	23.60 to 27.75
65% Rag	20.50 to 25.00
50% Rag	17.55 to 21.50
25% Rag	14.65 to 17.75
Regular Colors	1.00 cwt. extra

	per cwt.
Bonds (Sulphite)—	
No. 1	8.95 to 11.00
No. 2	8.05 to 9.75
No. 3	7.00 to 9.25
No. 4	7.30 to 9.00
Colors	1.00 cwt. extra
Glassine (f. o. b. mill)—	
Embossed (25 lb. up)	13.75 to 14.00
Bleached (25 lb. up)	12.75 to 12.87½
Unbleach. (25 lb. up)	11.00 to 11.25
Greaseproof—	
Bleach. (25 lb. up)	10.50 to 10.75
Unbleach. (25 lb. up)	9.50 to 9.75
Ledgers (Rag Content)—	
100% Rag	
Ext. No. 1	40.25 to 47.25
100% Rag	32.20 to 37.75
85% Rag	29.90 to 35.00
75% Rag	24.75 to 29.00
65% Rag	21.65 to 26.25
50% Rag	18.70 to 22.75
25% Rag	15.80 to 19.25
Regular Colors	1.00 cwt. extra
Ledgers (Sulphite)—	
No. 1	10.10 to 12.25
No. 2	9.25 to 11.25
No. 3	8.50 to 10.75
No. 4	8.50 to 10.25

	per ton
News—	
Rolls (Contract)	49.00 to 50.00
Rolls (Spot)	(nominal)
Sheets	58.00 -

	per ream
Tissues (Carlots)—	
White, No. 1	.97½ -
White, No. 2	.65 to .75
Anti-Tarnish M. G.	.80 to 1.05
Colored	.87½ to 1.10
Kraft	.80 to .90
Manila	.65 to .77½
Napkins, semi-crepe (12½ lb. to M shts.) per cs.	.41 -
Napkins, full crepe and emb'sed (12½ lb. to M shts.) per cs.	.43½ -
Toilet, Bleached (M shts.) per cs.	5.80 -
Toilet, Unbleached (M shts.) per cs.	3.50 -

	per case
Towels—	
Bleached	3.10 to 3.65
Unbleached	1.95 to 3.30

	per cwt.
Wrappings (Kraft)—	
Extra Quality	5.25 to 5.75
Super-Standard	4.87½ to 5.25
Northern Standard	4.25 to 4.75
Southern Standard	4.25 to 4.75

Wrappings (Sulphite and Bleached Kraft)— (Rolls, f. o. b. mill)

	per cwt.
Bleached papers—	
M.F. & M.G. Waxing, 20 lb. (Carloads only)	6.40 to 6.50
(10,000 lbs.)	6.60 to 6.90
Drug wrapp. 35 lb.	6.25 to 6.50
Unbleached Papers—	
Com. Grd. Butch. 40 lb.	4.50 to 4.75
No. 1 Butchers	5.00 to 5.12½
No. 1 Imit. Parch & Dry Fin. Groc. Sulphite 30 lb.	5.50 to 5.75
No. 2 Imit. Parch & Dry Fin. Groc. Sulphite 30 lb.	5.25 to 5.50
Steam Finish, 50 lb.	4.00 to 4.25
Water Finish, 40 lb.	4.50 to 4.75

Manilas—	
Envp. Mla., Sub. 16-40 (No. 1)	5.25 -
Envp. Mla., Sub. 16-28 (No. 2)	5.00 -
Envp. Mla. (Prices based on large sheets untrim'd ream-marked, in bdls.)	
Wrapp. Mla. 35 lb. up—	
No. 1	5.25 -
No. 2	5.00 -
M. G. Sulphite and Kraft (other than Waxing)	
Grade A-25 lb.	6.00 -
Grade B-25 lb.	5.50 -